SEPTEMBER 1956

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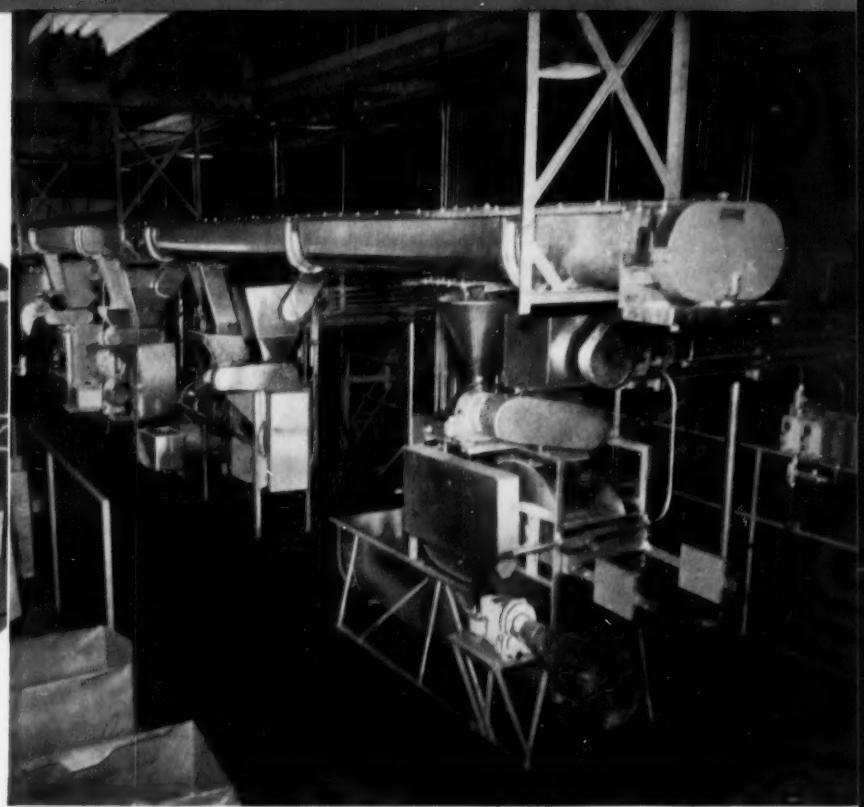
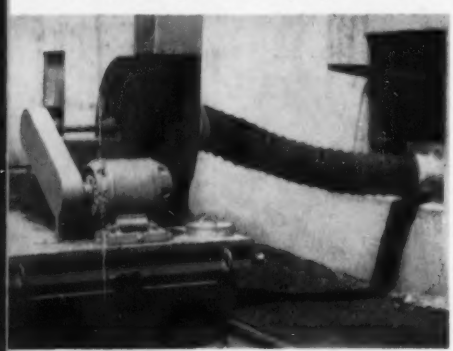
FOOD ENGINEERING

ENGINEERING • Line layout is easy with simple 2D, 3D models. p. 43



SANITATION • Traveling fan unit diffuses fumigant through grain. p. 74



PROCESSING • For quality freezing, berries are prepared by slicer-mixers. Screw (above) supplies sugar. Flowsheet, p. 102

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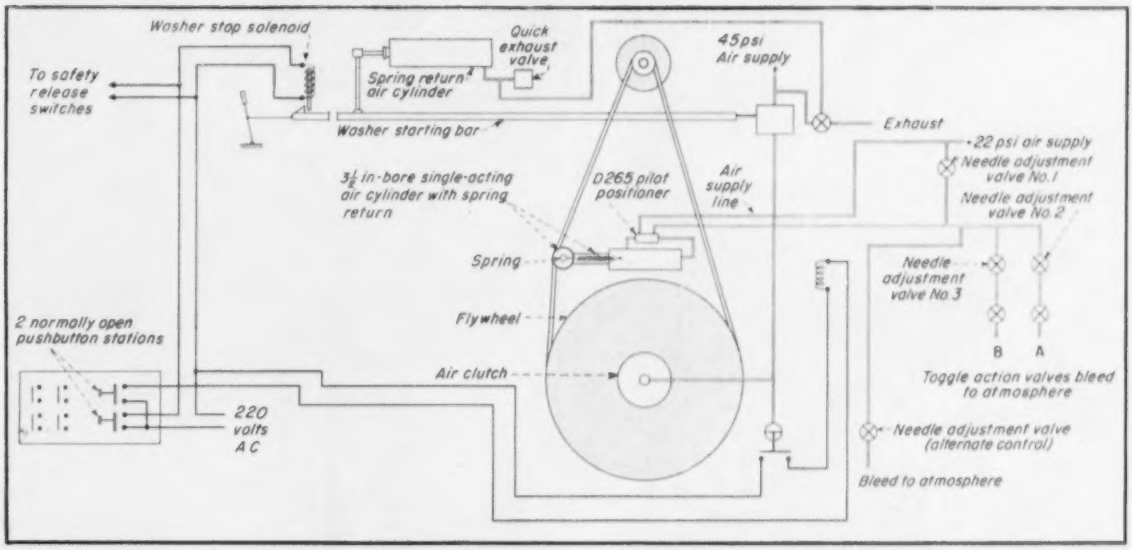

Speed-Control for Bottle Washer

A means was needed for actuating the starting bar of our bottle washer from a remote operating station, thus eliminate the expense of a washer operator.

We did it in this manner: The starting bar, which is ¾ in. x ¾ in. x 15 ft., runs part of the length of the washing machine. It operates various water and air valves (see sketch), including the air valve to actuate the air clutch.

This bar also includes the safety release mechanism. This allows the machine to operate under normal conditions until there is a jam, or a safety control is operated, whereupon the bar is released and returned by a spring.

An air cylinder was chosen as the robot or mechanical operator because less power is required to operate the mechanism, and it also provides the necessary 6-in. stroke or movement.

A three-way valve solenoid-operated, was installed to be controlled by the person at the operating station. Thus air is admitted into the cylinder to actuate the bar. When air goes to the clutch, a pressure switch opens the 3-way valve electrical circuit. This allows the cylinder to retract immediately, and thus prevent the operator from accidentally holding the cylinder in an operating position and so stopping the proper functioning of the safety release mechanisms.

A quick exhaust valve, close to the cylinder, was added to retract the cylinder more quickly. Also included was a pushbutton stop, incorporated to operate the washer stop solenoid at the operator's station.

The pressure switch also operates the pump which delivers final rinsewater to the pre-rinse jet header. This permits the pump to stop when no water is being reclaimed at the final rinse during the washer stop, and assures an ample water supply for the pre-rinse section upon start-up.

To facilitate operations, a Reeves type variable speed pulley was added to the dual V-belt drive. An air cylinder was also fitted with two small idler pulleys to tighten and loosen the belt as the air cylinder is positioned.

A pilot positioner (Johnson Service Co., Milwaukee, No. D-265) was used to provide accuracy and speed of positioning through pressure which is controlled by the operator. This pressure is regulated by an air-adjusted bleed port in connection with two off-on toggle-action valves (Hoke, Inc., Englewood, N. J., No. 1253).

Twenty-two psi. air pressure is supplied to the pilot positioner through an adjustable restriction (needle adjustment valve No. 1) with toggle valves A and B closed.

When these valves are both closed, pressure on the pilot positioner will be 22 psi. With valve A open, the pressure will decrease and will depend upon the opening of the needle adjustment valve No. 2. This is for normal running speed.

With both A and B open, pressure will be lessened further and can be adjusted with needle valve No. 3. This position will correspond to high speed.

An alternate method is shown which may interest those needing a speed which is continually variable.

A single needle valve is used to vary the speed over wide limits. When a washer stop occurs, the speed is

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(Formerly Food Industries)

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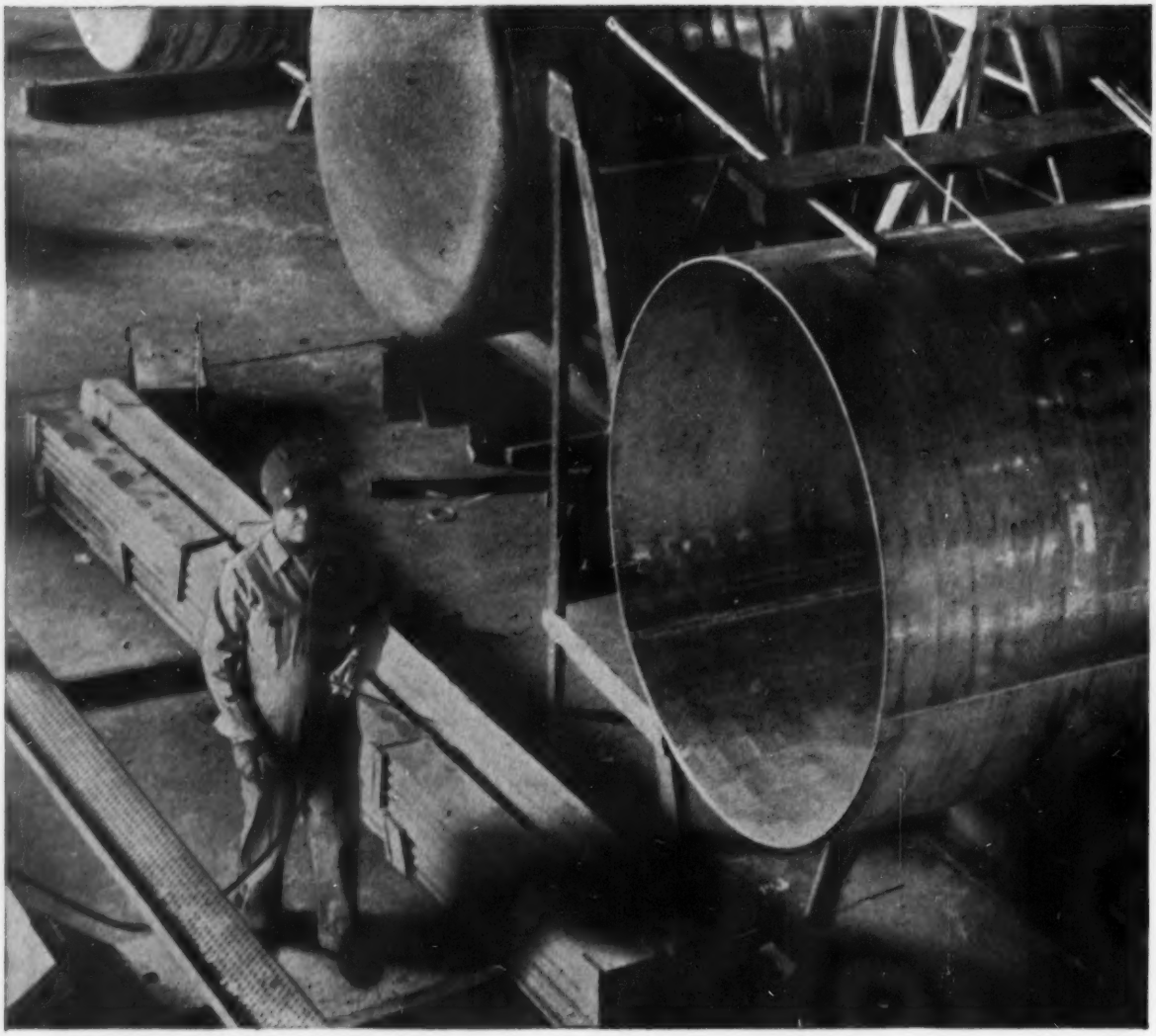

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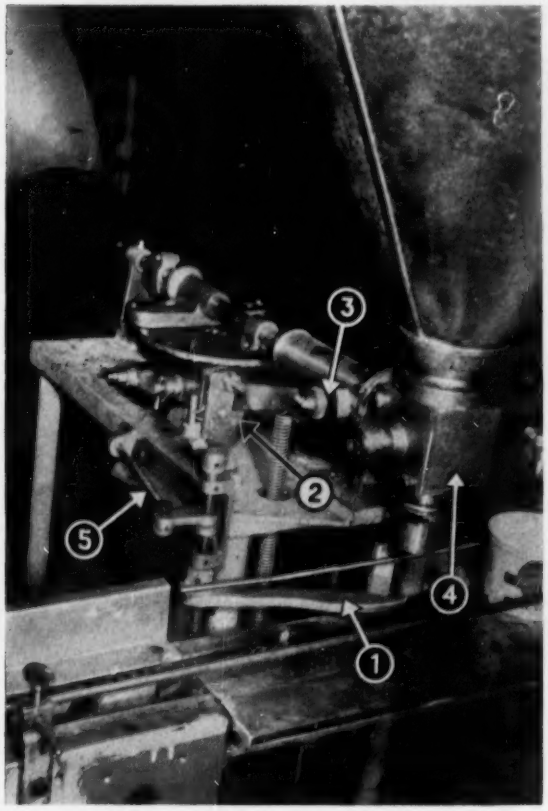
increased and bottling is continued with the vessels which have accumulated on the conveyor of the filler.

When the washer is started the bottles fill up this conveyor faster than the filler can accept them, thereby preventing a filler stop.—*James D. Meek, Jr., Production Manager, Coca-Cola Co., Fort Smith, Ark.*



Control for Syrup Filler

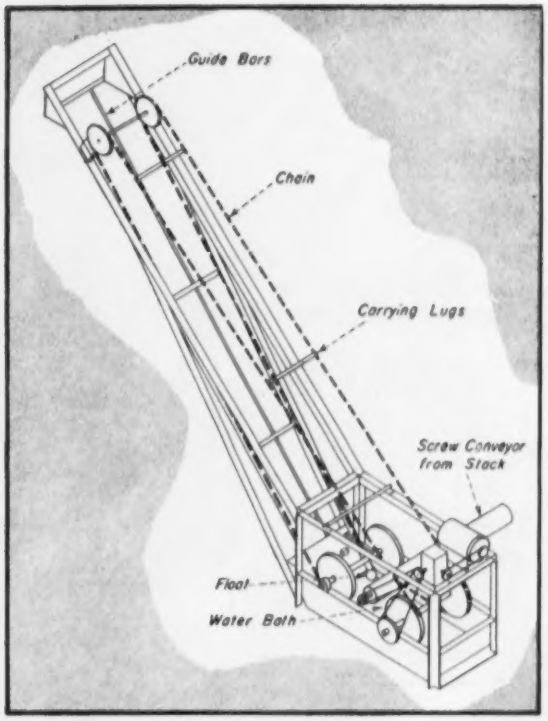
Our volumetric unit for filling syrup into whole strawberries in tub-type packages was formerly operated by gears turned by the roller chain conveying the tubs.

Thus, though it operated continuously, it was not equipped with a no-tub, no-fill control.

Frequently, however, in the filling and check-weighing of these packages, operators failed to keep the line completely filled. Also, at start-up and shut-down times, when packages were not under the filler, it would continue to discharge syrup.

We corrected this by installing a toggle system having a latch actuated by a starter-bar. We have also adapted a no-tub, no-fill device to this filler. The latch, when closed, will not permit the arm that opens the filler valve to operate. Thus, the filler cylinder, operated by a rotating plate, merely discharges syrup back into the syrup hopper.

When a package arrives under the filler spout, it pushes aside the starter-bar (1). Then, through the toggle system, this releases the latch (2) and permits the arm (3) to open the filler-valve (4). When one package passes the starter-bar, a spring (5) moves it back into place and the operation is repeated.—*Leonard Prechel, Packaging Foreman, Stokely-Van Camp, Inc., Santa Clara, Calif.*



Safe Way to Handle Fly Ash

The problem of fly-ash disposal, faced by many companies that burn coal to produce steam, has now been overcome by our plant, Iglehart Bros., division of General Foods Corp.

Steam at this plant is generated by blower-stoker fired furnaces, which burn a relatively low grade of coal, bringing heavy deposits of fly ash in the base of the smokestack. Thus, hand labor was required to remove the ash and load it for disposal—running up an annual cost of about $1,900.

Further, it posed other problems: Since fly ash is light and powdery, an appreciable wind during this cleaning and loading task, threatened to blow it about. And should doors and windows be open, product might be exposed.

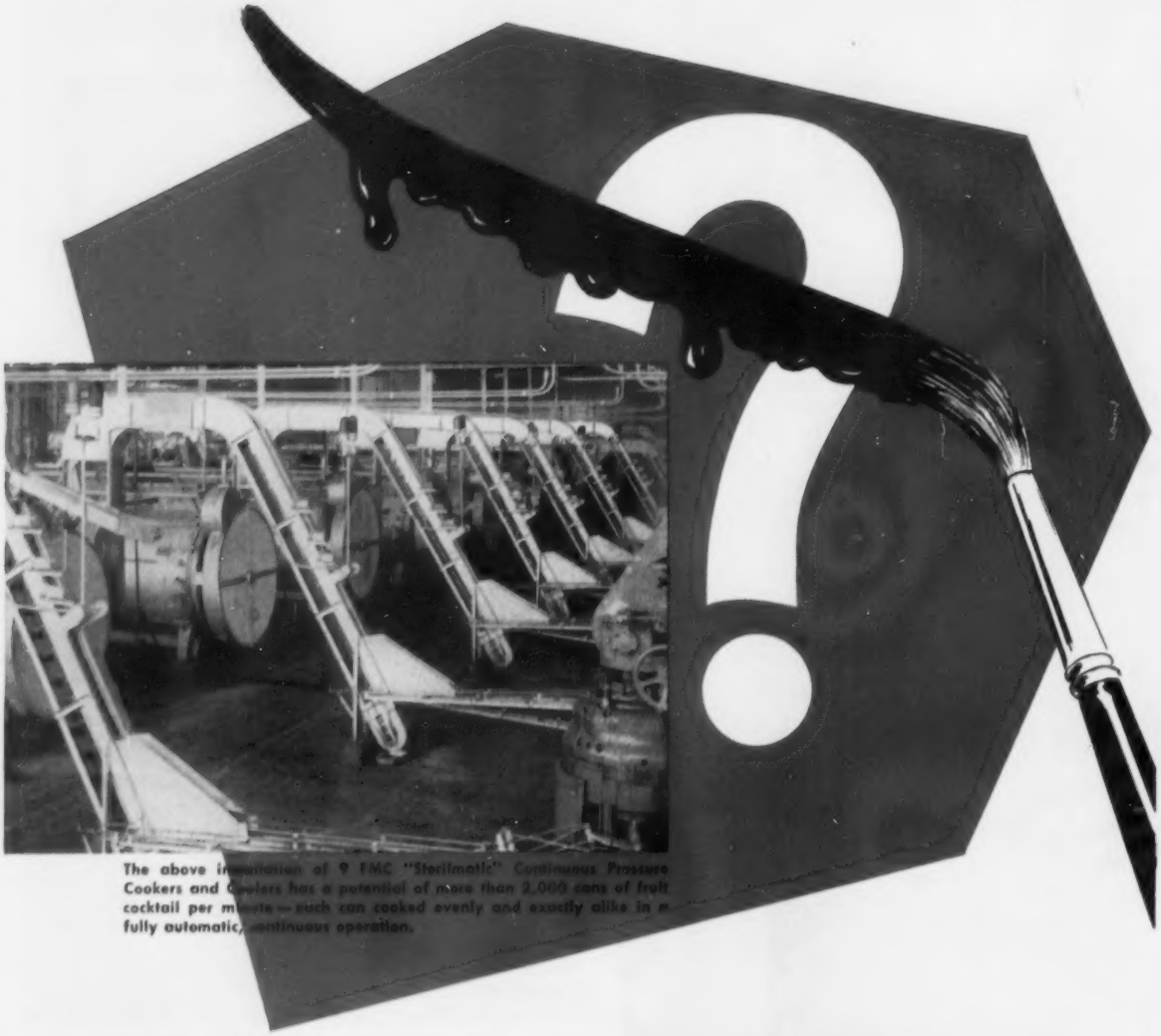
Also, the cleaning operation proved a definite safety problem. For when the cleaning door in the base of the stack was open, the draft created frequently ignited the ash in the deposit area.

Once it began to burn, the ash tended to "bridge," and so had to be dislodged manually. On one occasion, the stack belched flame through the clean-out entrance when a man was removing the ash.

Specifically, we needed a method of removing and disposing of the fly ash without exposing our workmen to unsafe conditions. We also wanted to eliminate possibilities of drifting of the ash about the area, yet keep maintenance expense low.

After investigating, we found initial cost of disposal units was excessive in relation to the comparatively small amounts of ash we had to remove—about 4 cu. yd. daily. So we sought a less expensive device tailored to our own requirements.

The ash remover that our engineers developed consists of a stainless steel conveyor screw placed in the ash



The above installation of 9 FMC "Sterilmatic" Continuous Pressure Cookers and Coolers has a potential of more than 2,000 cans of fruit cocktail per minute—each can cooked evenly and exactly alike in a fully automatic, continuous operation.

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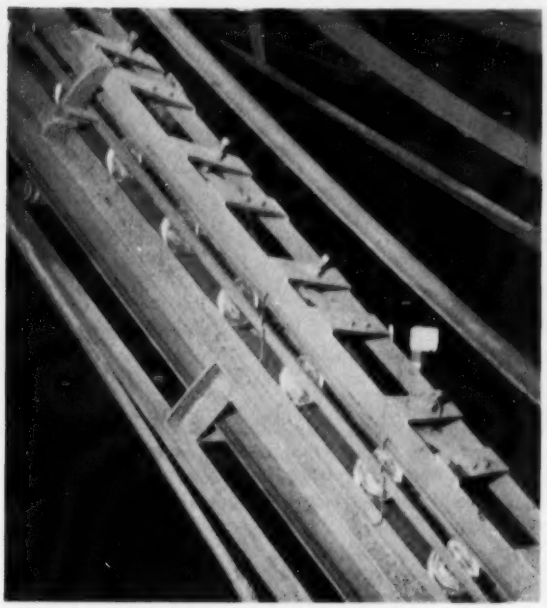
deposit area at the stack base. The screw withdraws the ash as it collects, then conveys it through an air trap into a constant-level water bath.

Air trap and water stop drafts in the deposit area, also insure that the ash is completely moistened, both to prevent ignition and to condition the ash so the wind doesn't scurry it.

A chain elevator arrangement scrapes the wetted ash from the water bath and deposits it on a trailer. The latter has a metal base bed. And there is a manually operated hydraulic lift to tilt the trailer for disposing of the load at the dump.

This unit has now successfully operated for about three years. Construction and installation costs were approximately $1,800, and maintenance and operating costs have been negligible. We just hook the trailer to a pickup truck and dump the load.

This idea has saved us about $1,500 yearly, besides eliminating a serious safety hazard and correcting the housekeeping problem. — *Technical Bulletin, General Foods Corp.*



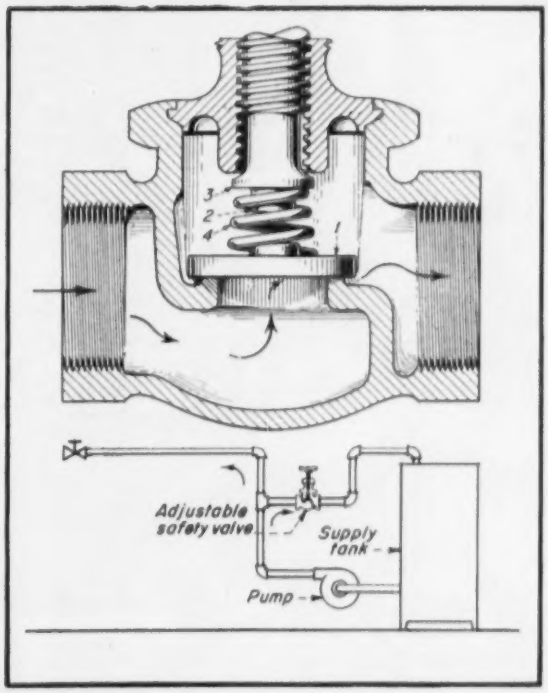
Can Elevator for Fruit Segments

When the conventional can elevator is employed, the cans move at considerable rpm. as they're lifted from one level to another.

For certain canned products, this rotation can be objectionable. The quality of grapefruit segments can be measurably dissipated by such can turning, which tends to break up the pieces of the product while they are still warm.

To overcome this difficulty, we designed our own conveyor (photo), which does not rotate the cans. They are lifted between two belts held in position by live rollers, both belts move at the same speed.

Since our operations are 'round-the-clock, permitting little opportunity for conveyor-bearing inspection and lubrication, Arguto self-lubricated wood bearings were installed on the rollers.—*H. E. Osteen, Plant Engineer, Snively Groves, Inc., Winter Haven, Fla.*



Simple Pump-Pressure Control

In lines from pumps, it is advisable to insert a relief valve for opening a bypass to return the liquid to the source whenever line pressure becomes excessive. This avoids the danger of damage to pump, pipe, or gages.

Special relief valves can be employed. However, for economy, or in emergencies, a satisfactory relief valve can be fabricated from an old globe valve in this way:

Cut off the shoulder—(1) in sketch—on the end of the valve stem that engages the seat, leaving a portion of the stem (2) below the shoulder (3) further up the stem.

Now fit a coil spring (4) over the stem to impinge against the upper shoulder, with the other end pressing against the cut-off portion of the stem and gasket surface, which rests on the valve seat.

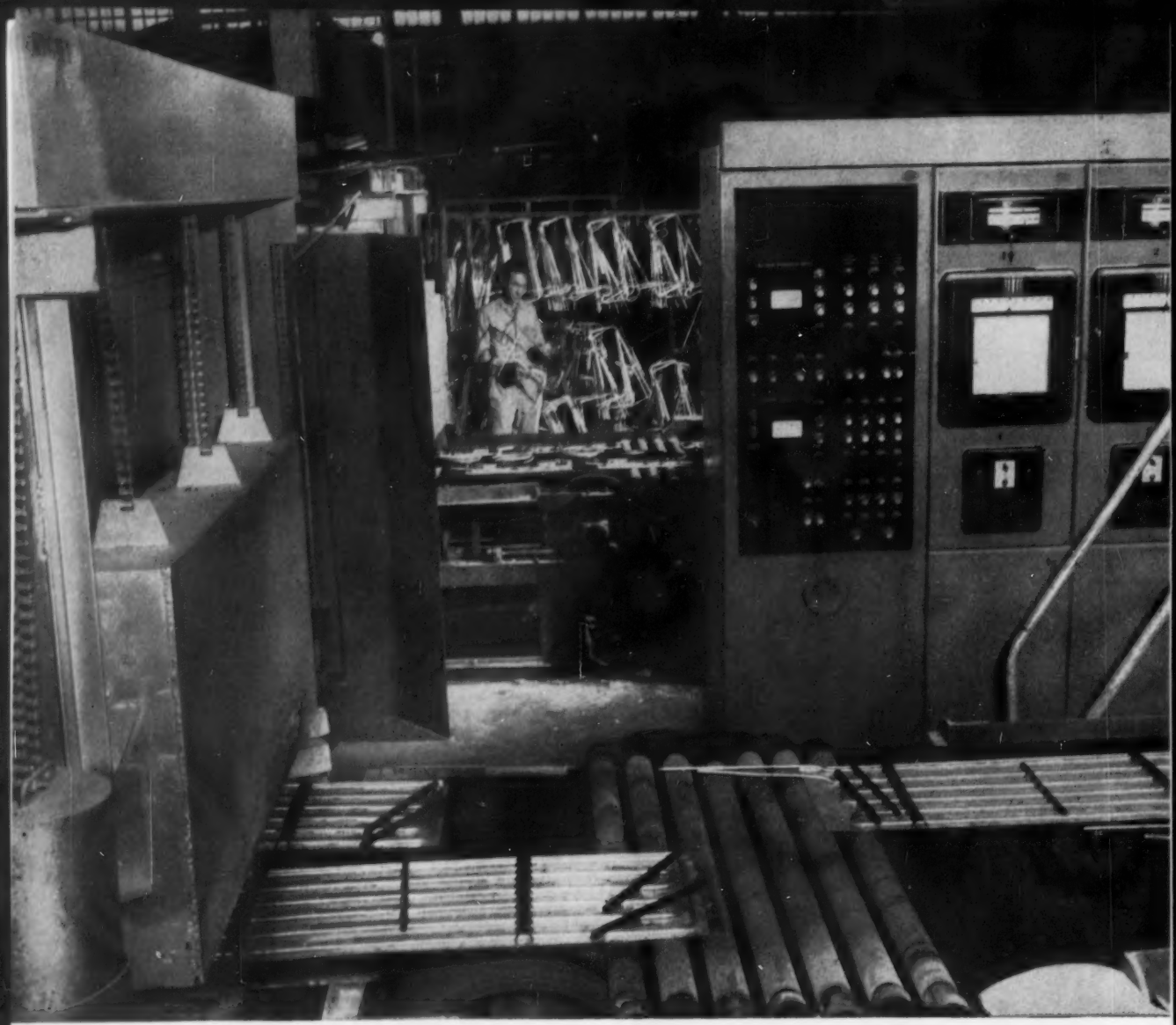
Of course, the choice of spring will depend on the pressure desired in the line. However, considerable variation in pressure on the valve seat may be obtained by raising or lowering the valve stem to shorten or lengthen the distance between the shoulder and the valve seat, thus increasing or relieving spring tension.

This type spring-loaded valve can be employed wherever pressure regulation is required.—*Jesse O. Reed, Development Engineer, retired, USDA, Washington, D. C.*

Door Frosting Curbed

An effective way to prevent refrigeration doors from frosting and sticking is to paint surfaces of thoroughly cleaned casings, floor ledges and door hardware with Prestone. Applications should be made twice weekly during summer months, less frequently in winter.

Painting casings with Prestone has another advantage: Air leaks through gaskets are indicated.—*The Refrigeration Research Foundation Bulletin.*



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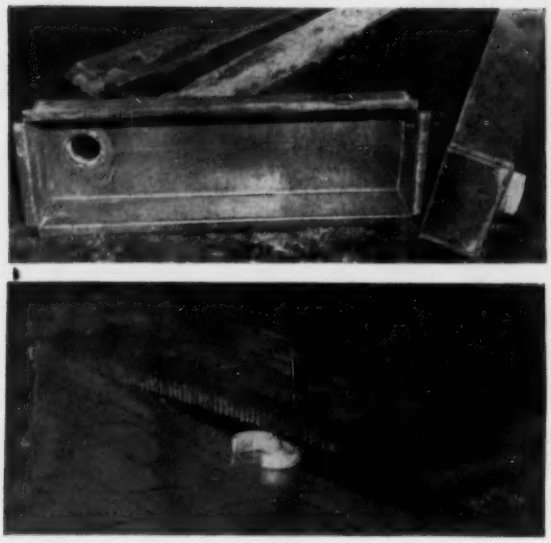


"Non-Clog" Floor Drain

In most departments in our dairy plant we experienced difficulty with clogged drains, especially during washdown periods.

But this trouble was eliminated when we installed our company-developed drains.

Here is how these new drains were fabricated and installed:

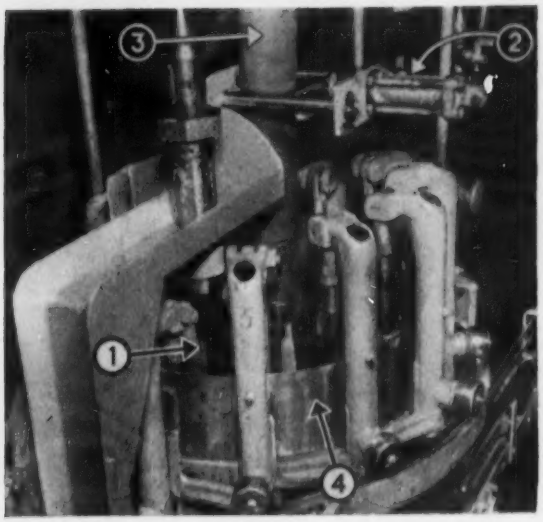
First, a sheet-metal pan was formed, with flanged edges and welded-on drain sleeve (see top photo). Pan was made large enough to provide considerably more drain area than is usual in conventional units.

This metal pan rests on drain structure recess provided in the concrete floor, with its outlet nipple inserted in the pipe to the sewer.

Then the pan is placed in such a position in this concrete recess that the lips of the pan are at the level of the concrete floor and resting on it.

When the tile is laid on the floor, the lips, sides, bottom, and ends of the pan are also laid with tile. Then into the recess, at its top, is inserted a removable grating (see bottom photo) made of lengths of strip steel a little shorter than the width of the recess.

Only at the drain sleeve is any pan metal exposed to the reaction of corrosive liquids. And since the contact is of short duration and followed by wash water, destructive activity is negligible.—*W. H. Chadderdon, Production Manager, Arcade Farms Co-op, Inc., Blasdell, N. Y.*



Filler-Bowl Level Control

Sliced strawberries, mixed with sugar, flow by gravity from our slicer-mixers, on a mezzanine, to the fillers below. Lacking controls, however, this continuous flow initially tended to overflow the filler bowls. Also, there was the possibility of short-fill, should product flow be irregular.

Accordingly, we combined an electro-mechanical system with a pneumatic jack to control this flow. Thus, we keep our carton fillerbowls at desired level. The system stops the flow when the level becomes too high, and it starts it when the level falls.

It is comprised of three electro-probes—(1) in photo—which extend into the bowl. In length, these probes are 3¼ in., 9¼ in., and 11¼ in. The electrical system includes two limit switches. One of these actuates the pneumatic-jack (2), and the other stops or starts the filler.

The two shortest probes control the product flow. If the level in the bowl reaches the shortest probe it actuates (closes) the pneumatic-jack, which pinches the product feed tube (3), to close it. When product level contacts the 9¼ in. probe, it also actuates (opens) the pneumatic-jack, permitting product to flow into the bowl. If the level should reach the tip of the longest probe, this control shuts down the filler.

With product held at approximately the same level in the filler-bowls, we have steady feed through the filler spouts. Since the carton fill is thus quite uniform, both over- and underfill are eliminated.—*Engineering Dept., Stokely-Van Camp, Inc., Santa Clara, Calif.*

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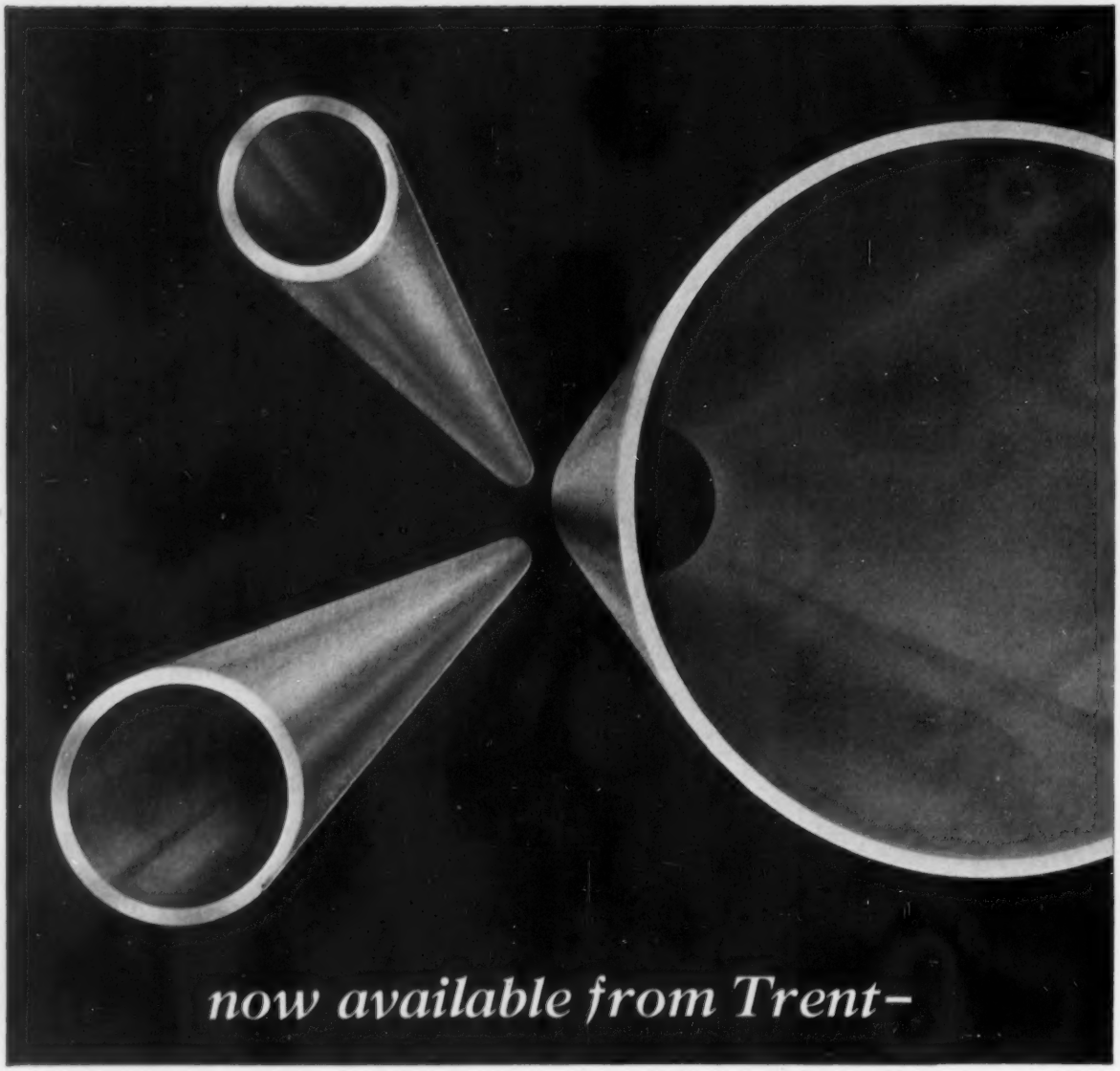
We'll do the finished writing and drawing for you.

Send it today, before you forget. Address it to Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.—The Editors.

JULY PRACTICAL IDEA WINNER was "Stop-and-Start Control," submitted by Piers Champman, Plant Mechanic, Buckfield Packing Co., Buckfield, Me.



Titanium Tubing

For processing lines carrying fluids of an extremely corrosive nature – look to *Contour Trentweld* titanium tubing for reliable service.

This titanium tubing is completely uniform throughout any cross-section. The weld zone is free from bulging weld bead because Trent's exclusive process – performed with the weld area at the bottom – forms the molten weld metal into the shape of the tubing.

And, with titanium, you get the unique advantages of a tubing that's strong as steel but 44% lighter . . . virtually immune to a broad spectrum of corrosive materials . . . entirely free from stress-corrosion cracking.

So, next time you need a strong, light, extremely corrosion-resisting tubing – try *Contour Trentweld* titanium tubing. And remember, it's made by Trent – tube mill specialists.

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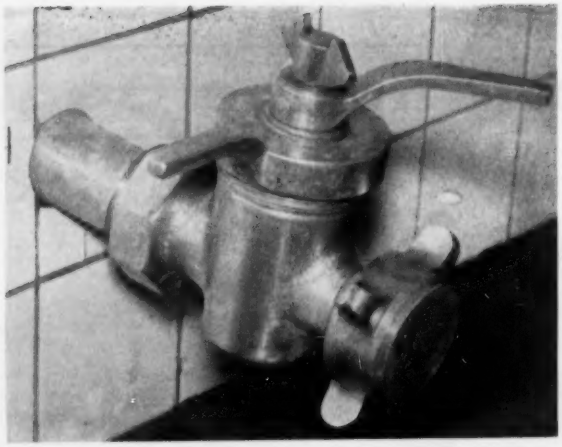
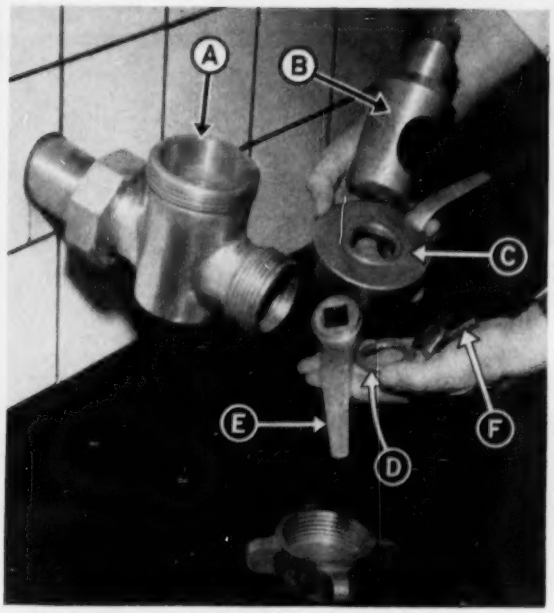




New Sanitary Type Valve

The bottom draw-off valve, designed by Tuborg Breweries, Ltd., Copenhagen, was primarily put to use on wort, beer, and yeast vessels. But it is also suitable for employment in many other types of food plants, since it is exceptionally easy to dissemble for cleaning and inspection.

The design has been employed for 40, 50, and 80-mm. valves of both the straight-way and three-way types.

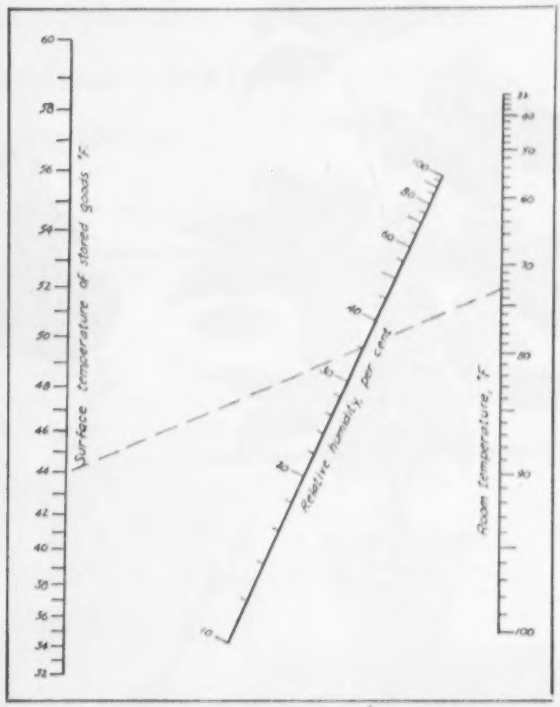
There are six parts to the valve: The casing—(A) in photo above; plug (B); clasp nut (C); lifting washer (D); lever (E); and wing nut (F).

New feature of the assembly is the clasp-nut which, fastening the valve plug into the casing, is turned counterclockwise. It raises the plug so that it can be turned with slight effort, regardless of the size of the valve.

If this clasp nut is unscrewed, the plug (B) can be taken out. Then, if the wing nut (F) is unscrewed, the valve can be disassembled. This simple operation makes for efficient cleaning and inspection of the valve.

Valve plug is constructed of gunmetal 5. The valve casing and other parts are of gunmetal 9. Stainless steel 18-8 is employed for the wing nut.

The oval bore of the valve plug makes possible a reduction of the overall dimensions, and hence cost of the valve. When used as the bottom outlet part of a yeast vessel, where cleaning always involves a disconnection of the valve, a unit of this type is advantageous, since it is easier to handle.—*FE Staff.*



Tells R.H. for Avoiding "Sweating"

The accompanying chart enables quick determination of the percentage relative humidity above which "sweating" of refrigerated products will take place.

Example (see dotted line): To prevent sweating, what is the maximum percentage relative humidity that can be tolerated when refrigerated goods stored at 44 deg. F. are moved into a room maintained at 73 deg. F.?

Run a straight line from the point 44 on the scale marked "Surface Temperature of Stored Goods" to the point 73 on the scale marked Room Temperature." Then the intersection with the slant scale reads 35% relative humidity, the maximum that can be tolerated if sweating is to be avoided.—*D. S. Davis, Professor of Engineering, University of Alabama, Mobile.*

Steering Clear of Explosion Hazard

Chemical cleaning of boilers, heat exchangers, pipe lines, and other equipment, is becoming increasingly popular. But attention is called to the explosion hazard that may exist during such operations because of the generation of hydrogen. Here, proper venting and the avoidance of sources of ignition are vital.—*Technical Bulletin, General Foods Corp.*

Your product is in the bag.

...with ATLAS food ingredients

Use Atlas sorbitol and emulsifiers for better taste, texture, keeping qualities...

put your product on more shopping lists

BREAD made with ATMUL® emulsifiers has improved texture, keeps soft and fresh-tasting longer. These are the emulsifiers with "optimum balance" of monoglycerides and diglycerides for exceptional results.

ICE CREAM made with ATMOS® emulsifiers is superior in dryness, body, texture . . . requires less time for whipping and overrun. High mono content assures good emulsification of the ingredients in the mix.

SOFT DRINKS of the low calorie variety have improved "mouth feel" and new taste appeal when Atlas sorbitol is added for flavor dispersion and bodying purposes.

SORBITOL—A superior conditioner and a wholesome food ingredient, helps retain the tender texture and softness of foods containing sugar. Mildly sweet, sorbitol blends well with other ingredients.

ATMUL and ATMOS emulsifiers provide a unique combination of high monoglyceride content and diglyceride bonus. They're made in the world's largest food emulsifier plant to the highest standards of purity and uniformity.

We'll be glad to show you how your product can gain the outstanding advantages of Atlas ingredients. Write for samples and suggestions.

FOOD INDUSTRY DEPARTMENT

ATLAS

CHEMICALS DIVISION
ATLAS POWDER COMPANY
WILMINGTON 99, DELAWARE

ATLAS POWDER CO., CANADA, LTD.
BRANTFORD, ONTARIO, CANADA

Here's How

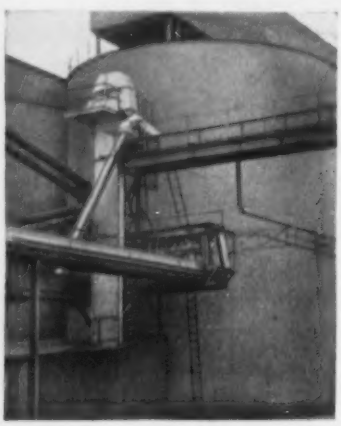
you can lower the cost of elevating

LINK-BELT will recommend the right bucket elevator from a broad range of 13 types

YES, not only does Link-Belt make bucket elevators for all types of material — there is specialization right down to spacing of buckets . . . the types of take-ups and hoods for utmost effectiveness. In addition, Link-Belt offers a wide range of buckets for further assurance of maximum efficiency in handling your materials.

Installation, maintenance and operating costs are low with Link-Belt Bucket Elevators. Rigid, jig-built casings are self-supporting, requiring only occasional lateral tie-ins depending on height. You have quick access to both head and boots for periodic inspections. Simple screw or gravity take-ups maintain chain or belt tension always.

To be sure of a bucket elevator system tailored correctly for your needs, include Link-Belt in the designing of your next plant. Get in touch with a materials handling expert through your nearest Link-Belt office.



ONE OF SEVERAL Link-Belt bucket elevator and screw conveyor combinations installed at a mid-west soy-bean oil mill. Equipment insures smooth flow of beans throughout process.

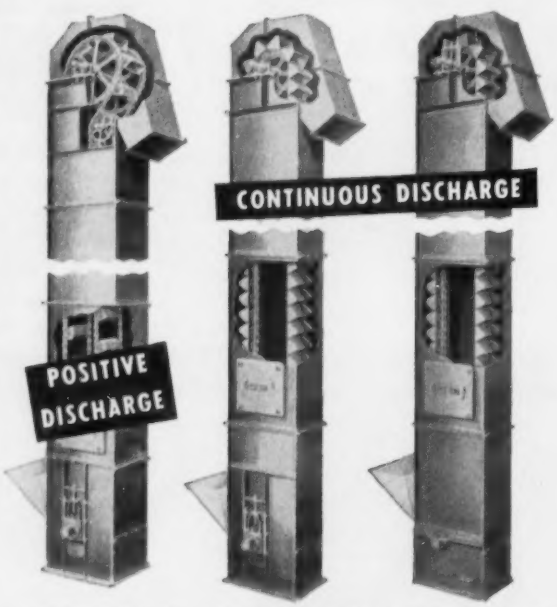
LINK-BELT

BUCKET ELEVATORS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 14.189

FOR LIGHT, FREE-FLOWING MATERIAL. Has welded steel, dust-tight casings.

Boot shaft furnished with gravity take-ups on elevators having 50-foot centers or more. Elevators have steel buckets mounted on belt. Curved hood is designed for proper discharge of material.

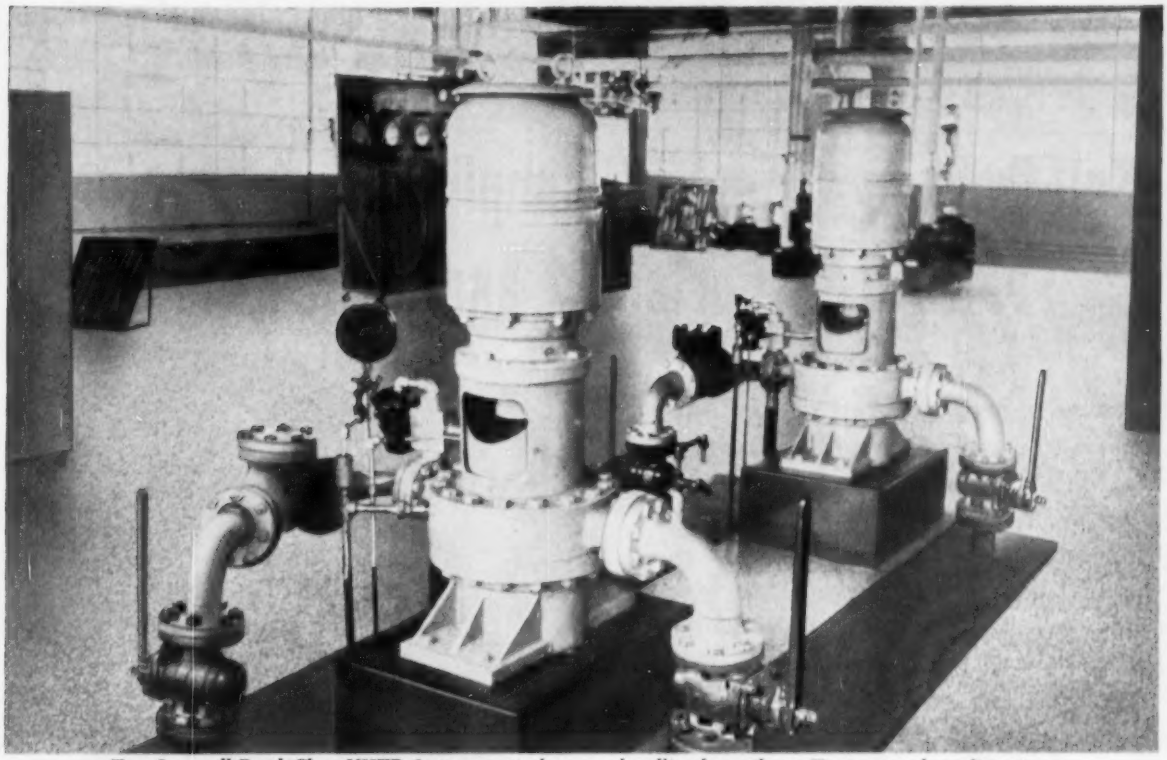


FOR LIGHT, FRIABLE, SLUGGISH MATERIALS. Buckets are mounted on double chain strands.

POPULAR FOR WIDE RANGE of material. Fixed head shaft, screw type boot shaft take-up.

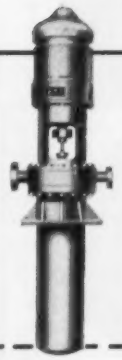
FOR CRUSHED MATERIALS WITH LUMPS less than ½". Fixed boot shaft, adjustable head shaft.

VERTICAL PUMPS



Two Ingersoll-Rand Class VHTB 6-stage vertical pumps handling lean oil at a Texas natural gasoline plant.

to lower your pumping costs



CLASS VHTB
Pressures: to 1500 psi
Capacities: 25 to 325 gpm
Temperatures: to 750°F.

Vertical, multi-stage diffusor-type unit. Single-suction impellers mounted back-to-back for axial hydraulic balance. Stuffing box under suction pressure.

For low capacities at high heads on process, boiler feed, hydraulic and similar applications.

CLASS VP
Pressures: to 750 psi
Capacities: 10 to 350 gpm
Temperatures: to 750°F.

Vertical, multi-stage, diffusor-type construction. Single-suction impellers with throttling sleeve balancing device to reduce axial thrust and provide suction pressure at stuffing box. Entire pumping element removable without disturbing suction and discharge piping.

For low capacities at medium high heads on applications such as process, boiler feed, and heater drain work.

Designed specifically for low-capacity high-head applications, these Ingersoll-Rand vertical process pumps are engineered with a background of process pump experience. They are manufactured in the most modern of pump plants to deliver years of efficient service with a minimum of down time and maintenance expense.

Features include: "Double-Case" construction with segmented diffusor-type inner casing for complete radial hydraulic balance and minimum bearing wear... Positive aligning feature for perfect positioning of inner casing segments... Rotor assembled without prestressing shaft to eliminate all possibility of shaft distortion. Available in bronze fitted, all iron, carbon steel, and stainless fitted materials to cover a wide range of process services.

Ask the Ingersoll-Rand engineer to show you these and other features which make Ingersoll-Rand pumps your best bet for low cost year-in, year-out service.

Ingersoll-Rand

10-376 **11 BROADWAY, NEW YORK 4, N.Y.**

COMPRESSORS · GAS & DIESEL ENGINES · AIR & ELECTRIC TOOLS · CONDENSERS · PUMPS · ROCK DRILLS · VACUUM EQUIPMENT

CONTINENTAL *Landmarks*

Periodic progress reports of interest and value to the food processing field

Self-tracking Gripstrip® simplifies key-opening of coffee, shortening and meat cans

The annoying problem of "off-key" rip strips on key-opening cans has now been eliminated with Continental's self-tracking Gripstrip. Developed by Continental engineers, Gripstrip consists of a multiple bead between the scored lines of the rip strip. Thus, each turn of the key locks this beaded strip into a slip-proof coil . . . all the way around the can.

Already in wide commercial use on Continental coffee and shortening cans, Gripstrip is now also available on our 12-oz. luncheon meat cans, large oblong meat cans and pear shape ham cans.

In addition to offering the consumer extra convenience, Gripstrip actually strengthens the can body. Yet Gripstrip cans cost packers no more than ordinary containers.

Like so many other Continental advances, Gripstrip demonstrates our continual interest in every detail of packaging quality — backed by nationwide facilities for research and development.

CONTINENTAL CAN COMPANY

Eastern Division: 100 E. 42nd St., New York 17
Central Division: 135 So. La Salle St., Chicago 3
Pacific Division: Russ Building, San Francisco 4

for
a New DENSITY HIGH
in
Concentrating Heat-Sensitive
Liquids

Use a Buflovak
ROTO-VAK
Concentrator

It provides these PROFIT-BUILDING features:

- High concentration of a wide variety of heat-sensitive, viscous and foamy food products and chemicals
- Sterilization combined with concentration
- Increased capacity
- Lower operating cost
- Simplicity of operation
- Ease of cleaning
- Dependable, uniform results, with original qualities of the product retained

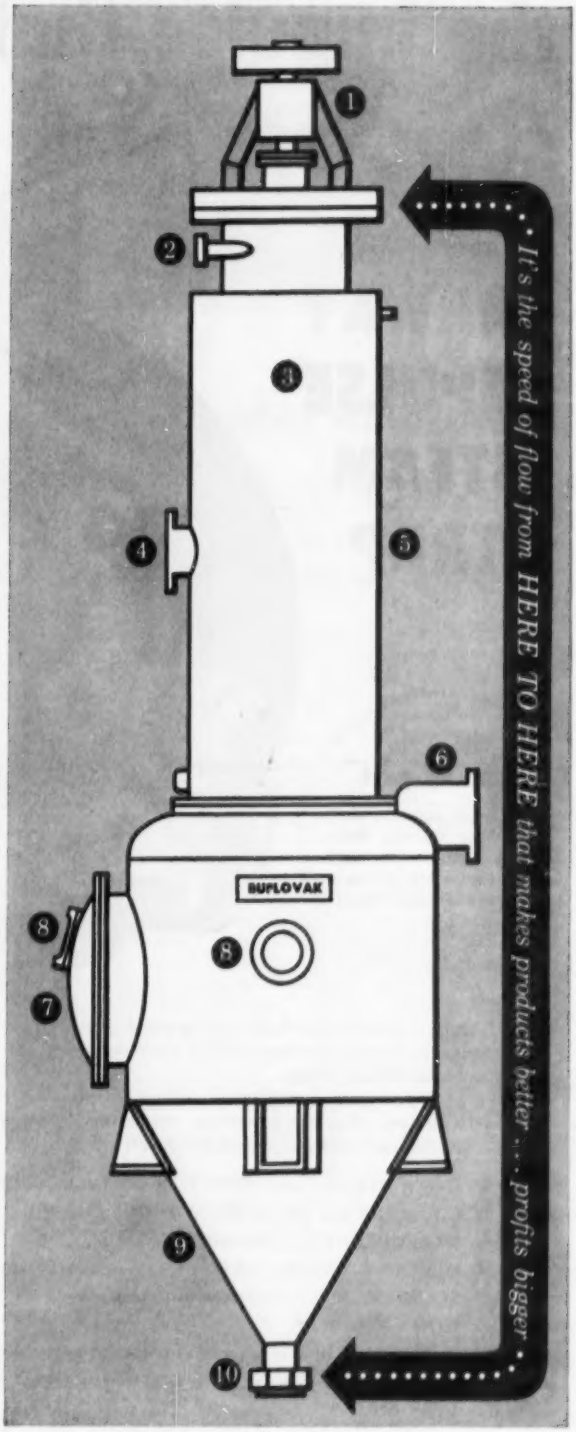
The Buflovak ROTO-VAK Concentrator employs the single pass, downflow principle, plus positive agitation. The combination gives entirely new results, with concentrations of many liquids carried to higher densities than can be satisfactorily accomplished in conventional type evaporators, retaining or improving desirable quality of the concentrated product.

The ROTO-VAK is extremely flexible, operating successfully through a wide temperature range and safely and effectively performing sterilization along with concentration.

We will be glad to test your product on a semi-plant scale with our laboratory model ROTO-VAK Concentrator in the Buflovak Research Laboratory and Testing Plant. Complete information on request.

ASK FOR BULLETIN NO. 369

50th Anniversary
BLAW-KNOX
1906-1956



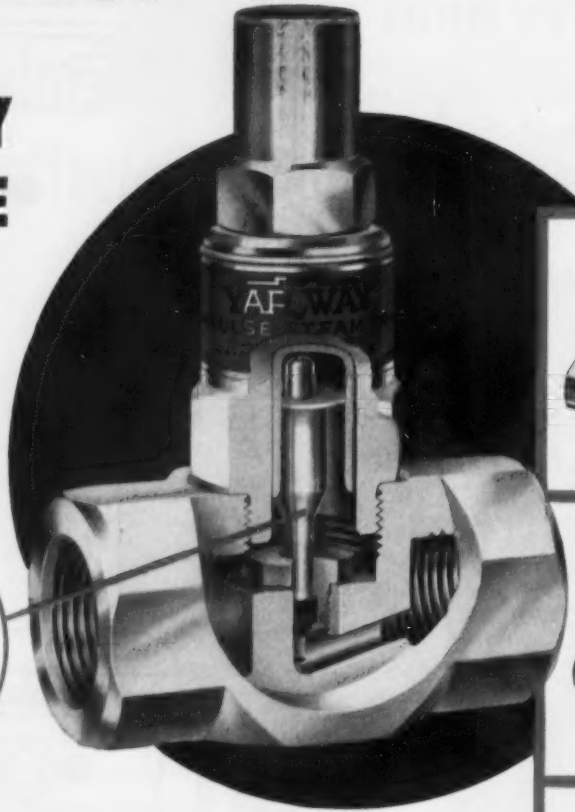
(1) ROTOR DRIVE (2) PRODUCT INLET (3) INTERNAL VAPORIZATION TUBE (equipped with rotor to increase heat transfer) (4) STEAM INLET (5) EXTERIOR HEATING SECTION (6) VAPOR OUTLET (7) QUICK OPENING DOOR (for easy cleaning) (8) OBSERVATION GLASSES (9) CONE BOTTOM (10) FINISHED PRODUCT OUTLET (no recirculation)

BLAW-KNOX COMPANY

Buflovak Equipment Division, 1631 Fillmore Avenue, Buffalo 11, N. Y.

the impulse that revolutionized steam trapping

YARWAY IMPULSE STEAM TRAP



the only moving part

...a small stainless steel valve that literally floats on the condensate load. Gets equipment *hot in a hurry—and keeps it hot!*

SERIES 60 and 120

For all *normal* trap requirements, pressures to 400 and 600 psi.

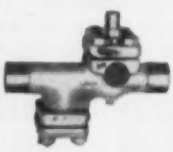
½" No. 20-A

For *light loads* on tracer lines, steam mains, small presses, etc.

SERIES 40

For *heavy loads* requiring extra high capacity steam traps.

INTEGRAL-STRAINER HIGH PRESSURE TRAP



For *high pressures, high temperatures.* (Flanged or welding connections.)

Twenty years ago YARWAY applied a unique theory of thermodynamics to steam traps—and gave industry the amazing YARWAY Impulse Steam Trap.

Today—over a million YARWAY Impulse Steam Traps later—advantages like the following continue to convert new users, and convince old users to standardize on the YARWAY Impulse:

- **QUICK HEAT-UP AND EVEN TEMPERATURES OF EQUIPMENT**
- **GOOD FOR ALL PRESSURES WITHOUT CHANGE OF VALVE OR SEAT**
- **SMALL SIZE—LIGHT WEIGHT**
- **ONLY ONE MOVING PART**
- **STAINLESS STEEL—minimum maintenance**
- **WON'T FREEZE UP**
- **A COMPLETE LINE of sizes and types for every requirement**
- **IMMEDIATELY AVAILABLE from 270 local Industrial Distributors**

For free Trap Selector, or 24 page Bulletin, write

YARNALL-WARING COMPANY
127 Mermaid Avenue, Philadelphia 18, Pa.

YARWAY IMPULSE® STEAM TRAP

OVER 1,000,000 YARWAY IMPULSE STEAM TRAPS USED

Standard Oil's Stan Nelson (left), with Federal Bakery men (l. to r.); E. L. Hostettler, general sales manager, C. F. Baumann, garage superintendent and Wendel Fish, general manager, inspects one of bakery's trucks that has 100,000 miles of service and yet has required no major maintenance.

It takes a lot of work to deliver a loaf of bread

Federal Bakery Co., Winona, Minn., makes it as easy as possible — uses only **STANOLUBE HD-M** *Motor Oil*

Federal Bakery Co., Winona, Minn., keeps close watch on maintenance costs, has one of industry's lowest cost-per-mile records. S. E. Nelson (left), Standard Oil automotive lubrication specialist, Arne Steivang (center) and Charles Baumann, Federal Bakery garage superintendent, confer about truck maintenance records. Helping customers with lubrication problems is something Stan Nelson is well qualified for. An engineer with a degree from the University of Minnesota and a graduate of Standard Oil Sales Engineering School, Stan has 8 years' experience. Customers find help from Stan Nelson pays off—*for them.*

Everyone expects bread to be delivered fresh and on time. The housewife makes no allowances for rugged delivery schedules, bad weather, tough roads. Federal Bakery Company makes fine bread and delivers it to Southeastern Minnesota and Western Wisconsin *on schedule* no matter what the weather. A good PM system and the use of STANOLUBE HD-M Motor Oil in all of the company's trucks are two of the big reasons why Federal gets the job done.

And getting the job done is not just good enough for Federal. The Federal fleet of 40 Ford units —F-1's to F-600's—has one of the lowest cost-per-mile records in the Quality Bakers of America membership. Federal Bakery trucks have as much as 100,000 miles without even the pan removed. Other units have 250,000 miles on the chassis with many, many more miles still to go.

This kind of performance from equipment is routine for Federal Bakery. Helping trucks deliver low cost-per-mile service is routine for STANOLUBE HD-M Motor Oil.

The hot engine, long haul of Federal's over-the-road units, or the short trip, low temperature, frequent idling service of street delivery units—it is all the same to STANOLUBE HD-M.

Handling extremes of service, no matter what it is—in diesel or gasoline equipment—is built into STANOLUBE HD-M. Its highest quality base stock and additive formula mean clean engine performance, no varnish, no sludge, no carbon-like deposits.

Find out more about STANOLUBE HD-M Motor Oil. Call your Standard Oil automotive lubrication specialist. There is one near you in any of the 15 Midwest and Rocky Mountain states. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD

STANDARD OIL COMPANY
(Indiana)

You can duplicate this profitable success story

Promotion-Minded Packer

Here's how Scott Petersen carried out "Flavor-Improved" drive

Huron man helps explain the promotion to interested routemen . . .

A whopping 25% increase in sales volume has rewarded the Scott Petersen Company's recent flavor-improvement decision and "tell-them-about-it" merchandising campaign . . . built around use of Huron MSG!

Scott Petersen, Jr., dynamic president of the Chicago sausage kitchen, was convinced by independent taste tests of Huron MSG's effectiveness in intensifying fresh pork sausage flavor. He incorporated the "Taste-Maker" into his seasoning. Then, in cooperation with Huron, a full-scale merchandising drive was launched through routemen.

The complete "Even tastier today . . . because MSG is in it" story was carefully explained by Scott Petersen management and Huron representatives. Routemen were supplied with colorful in-store display materials and ad reprints. Pressure-sensitive stickers repeated the "now tastier" theme from each product package.

The enthusiastic routemen went out and *sold* . . . convinced retailers *sold* . . . pleased customers by the thousands tried the sausage and soon were *back for more*. Contact Huron *today* if you'd like to boost your sales the same way. Like Huron MonoSodium Glutamate 99+% Pure itself, this tested promotional idea can work wonders for your product.

Full-page, four-color newspaper ad gets the story to consumers . . .

Package stickers carry the theme to the point of purchase . . .

Routeman uses material to sell larger order: "So you'll have enough on hand" . . .

And don't overlook this versatile favorite

Huron HVP

HYDROLYZED VEGETABLE PROTEINS
THE FLAVOR OF MEAT FROM WHEAT

available in a full line of powders, pastes and liquids to add the mouth-watering richness of braised beef . . . at surprising economy

BOOSTS SALES 25%

by merchandising the better flavor Huron MSG builds in pork sausage

Stores feature the product in traffic-stopping displays...

Promotion results in thousands of added sales all over Chicago.

You can get these effective hangers and talkers, with blank imprint space, and other material from Huron... send for details *today*.

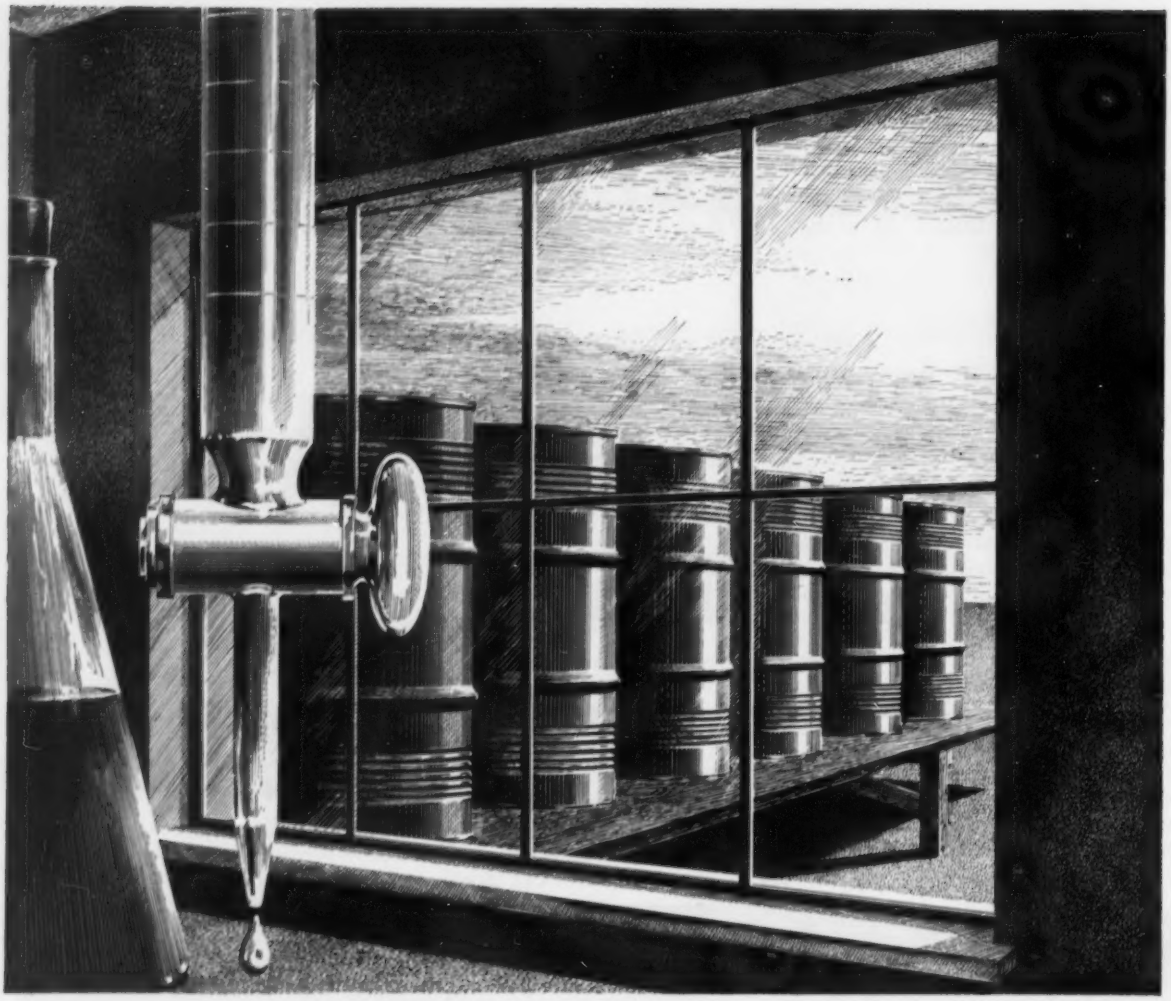
YOUR ONE SOURCE FOR BOTH THESE TASTE-BUILDERS

Huron

THE HURON MILLING COMPANY

MSG • HVP • AGE-IT
American Pioneers in Protein Derivatives

Executive Office: 3101 N. WOODWARD AVE., P. O. BOX 9, ROYAL OAK, MICH.
Sales Offices: 9 PARK PLACE, NEW YORK 7 • 161 E. GRAND AVE., CHICAGO 11 • 383 BRANNAN ST., SAN FRANCISCO 7 • 607 SECOND NATIONAL BLDG., CINCINNATI 2
Factory: HARBOR BEACH, MICHIGAN



Your QUALITY CONTROL can travel

Shipping in USS Steel Drums means maintaining your own rigid quality control measures right into your customer's plant. Special measures taken in the manufacture of USS Steel Drums make them able to act as a rolling Fort Knox, keeping your product clean and pure—all the way.

To protect your product against contamination, every drum-body, head and bottom is freed of ALL manufacturing dirt, grease and scale. With component parts virtually "hospital clean" the drum-parts are ready for the final step. This consists of applying all inside and outside surfaces with a special phosphate solution that inhibits rusting and serves as an excellent bond for external paint application. The USS Steel Drum is ready for its job of protecting your product from contamination.

USS Steel Containers are available in sizes from 2½ to 110 gallons . . . with a wide variety of special fittings and openings to answer any need. Always specify product-protecting USS Steel Drums.

UNITED STATES STEEL PRODUCTS
DIVISION
UNITED STATES STEEL CORPORATION
DEPT. 6106, 30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.
Los Angeles and Alameda, Calif. • Port Arthur, Texas
Chicago, Ill. • New Orleans, La. • Sharon, Pa. • Camden, N. J.

USS STEEL DRUMS

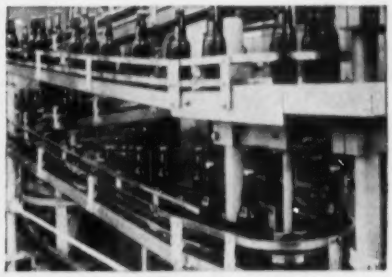
"It's Better to Ship in Steel"

USS

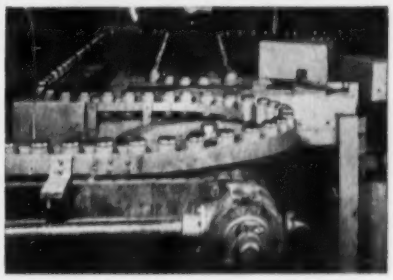
UNITED STATES STEEL

For smooth, economical conveying--carry it on Link-Belt flat-top chain

EASY-TO-CLEAN Link-Belt S-815 flat-top chain conveyor moves baby food jars smoothly during careful inspection at this Michigan plant.



VERTICAL OR HORIZONTAL CURVES offer no problem for universal crescent flat-top chain.



SMOOTH HANDLING is assured as RC flat-top chain carries jars through filling and capping operations.

Choose from many types of LINK-BELT carrying chain

WHETHER you're handling baby food or beverages—cartons or cans—there's *one* chain in the complete Link-Belt line that will meet your exact needs. The chains pictured above, for example, are only three of many types of Link-Belt flat-top chain.

Link-Belt also builds a variety of cast, combination, forged and fabricated steel chains. They're available with a wide range of attachments for specialized services.

As for drive chain on your food handling machinery, Link-Belt offers an equally broad range of types, including roller and silent chain. High or low speeds . . . heavy shock loads or moderate duty—you'll find the right answer in Link-Belt chain.

There are Link-Belt offices in every principal industrial area. Call the one near you for an impartial analysis of your drive or conveying chain needs.

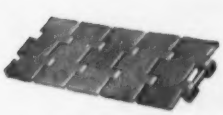
LINK-BELT

CHAINS and SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

13.690

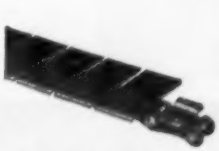
No one chain serves every purpose . . . get the RIGHT one from Link-Belt's complete line



S-815 flat-top conveyor chain—economical, sturdy, reliable, easy to detach and to keep clean.

Class RC universal crescent flat-top chain for multi-plane operation in a variety of paths.

Class RC crescent flat-top chain—travels in horizontal planes and around corners.



Class RC flat-top chain—precision made for smoothest, spill-free carrying and long life.

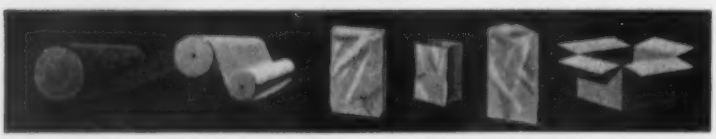
Class 400 swivel chain—carries cartons, cases, etc. over paths with both vertical and horizontal turns.

Get it there
Safe and Sound
with
tough-tempered
FROSTKRAFT
packaging

Whether you ship first class or worst class — around the corner or to the ends of the earth — safe arrival is essential to your business . . . and to your customers'.

Safe delivery by FROSTKRAFT bags and boxes is a surefire result of quality control by Olin Mathieson . . . all the way from forest to finished product.

Your FROSTKRAFT representative has the know-how to help you ship safe and sound with kraft — anywhere — why not call him in today?



FROSTKRAFT
paper products
FOREST PRODUCTS DIVISION
OLIN MATHIESON CHEMICAL CORPORATION
WEST MONROE, LOUISIANA

NOW . . . A new and better way to freeze fish, meats and vegetables with . . .

the GREER CONTINUOUS MULTI-TIER FREEZER having features no other freezing system can match

AMAZING SAVINGS IN FLOOR SPACE

Freezer illustrated packs over 2800 sq. ft. of freezing area and 4 hours of freezing time in floor space only 10′ x 64′. Variety of other models with even greater savings to match your plant and product requirements.

MAKES FREEZING A SIMPLE, CONTINUOUS PROCESS

A series of moving trays carry products through freezing cycle continuously, automatically. Increases man-hour output.

FASTER, MORE UNIFORM FREEZING, TOO

Continuous motion plus open-tray construction insures positive air circulation—exposes products in each tray to absolutely uniform, controlled conditions.

A COMPLETE, PACKAGED FREEZING PROCESS . . .

Engineered to your production requirements and building facilities. Complete refrigeration systems included.

TESTED . . . PROVEN

Write for informative Bulletin #55-122

Actual installations prove GREER freezers make freezing fast, economical. Save space, boost quality control.

J. W. GREER COMPANY

WILMINGTON, MASSACHUSETTS

Sales Engineering Offices: Chicago, Ill., San Francisco, Calif.

GREER

D&O CONDIMENT SEASONING CHART

For manufacturers supplying the vast "condiment" market, D&O has developed several specific lines of seasoning products. Each group possesses distinct qualities required by certain types of condiment products, making for an extensive and versatile coverage of the field. The chart below presents, briefly, these basic properties. For more complete information, order copies of the brochures prepared especially for this purpose.

PRODUCT	D&O SEASONING RECOMMENDED	PROPERTIES
PICKLES AND RELISHES	SPICEOLATE SPISORESIN SPISORAMA	*Spiceolate Seasonings* Water-soluble, spice flavors made from pure natural oils and oleoresins. Completely pure.
SALAD DRESSINGS	SPICEOLATE SPISORAMA SPECIALTY #M1002	*Spisoresin Seasonings* Oil-soluble seasonings made from special extractions of natural spices. Completely pure.
SAUCES AND CATSUP	SPICEOLATE SPISORAMA	*Spisorama Seasonings* Dry-soluble seasonings made from pure oils and oleoresins, prepared on a dry carrier for easy dispersability.

Available on request
- SPICEOLATE BROCHURE
- SPISORESIN-SPISORAMA BROCHURE
- SALAD DRESSING BROCHURE

Essentially for You

D&O ESTABLISHED 1798 ®

OUR 157th YEAR OF SERVICE

DODGE & OLCOTT, INC.

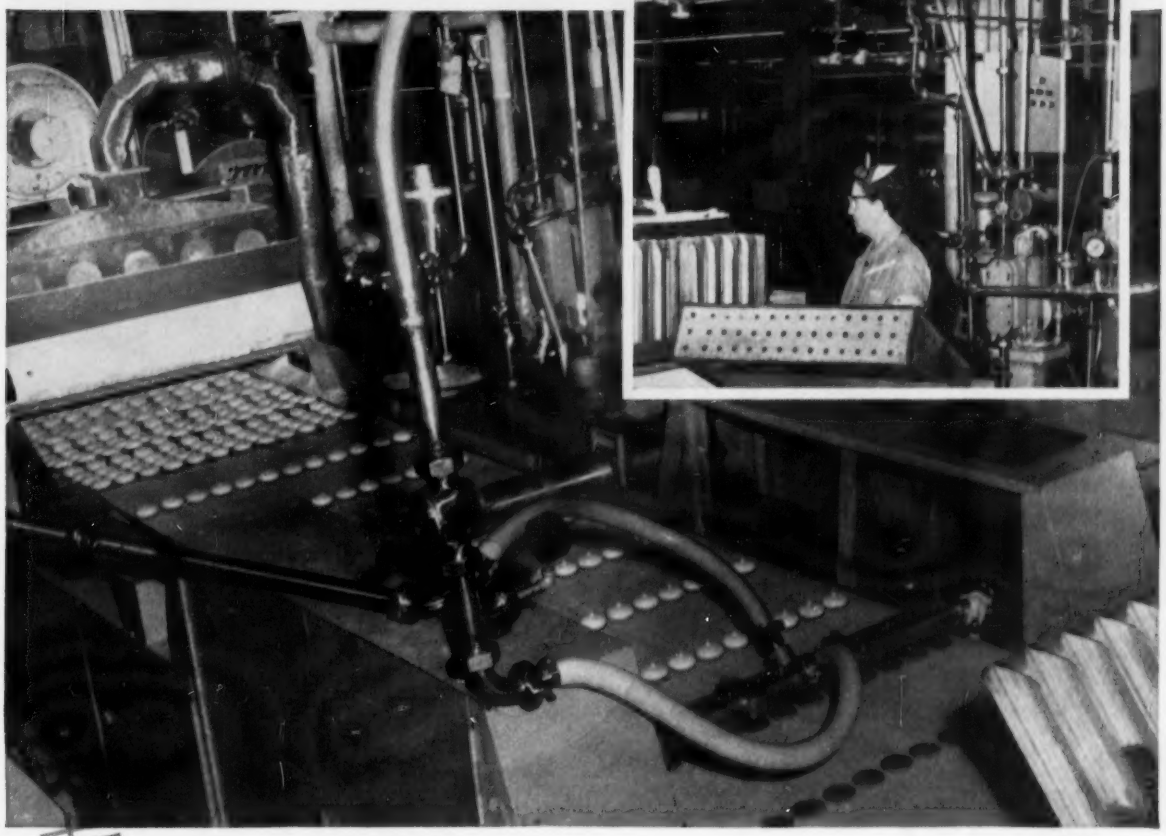
180 Varick Street, New York 14, N. Y.

Sales Offices in Principal Cities

ESSENTIAL OILS · AROMATIC CHEMICALS · PERFUME BASES · FLAVOR BASES · DRY SOLUBLE SEASONINGS

TRI-CLOVER FITTINGS Protect Product Quality

in the WORLD'S LARGEST BAKERY



NABISCO

NATIONAL BISCUIT COMPANY'S New Chicago Bakery is the largest biscuit and cracker bakery in the world. This modern, efficient plant utilizes rigid laboratory controls and elaborate sanitary measures to guarantee products of the highest quality.

Helping NABISCO to achieve these outstanding results are scores of Tri-Clover Division's sparkling clean stainless steel sanitary fittings, valves and tubing, used in numerous cookie and cracker baking and processing operations. For here, as elsewhere throughout the food processing industries, users have found that there is no substitute for the high quality and complete sanitation inherent in Tri-Clover products.

Let our engineering staff help you achieve new standards of efficiency and sanitation.

Call or write for further information.

• *Top view shows a few of the Tri-Clover valves and other fittings used in handling various cookie fillings and coatings.*

• *The large view shows a close-up of part of the Tri-Clover sanitary valves and fittings used to feed marshmallow topping used on Nabisco's well known "Fancy Crest" cookies.*

LADISH CO.

Tri-Clover Division

Kenosha Wisconsin

See your nearest TRI-CLOVER Distributor

TRI-CLOVER

Export Dept. 8 So. Michigan Ave. Chicago 3, U.S.A.

S956

PERFORMANCE REPORT ON AMERICA'S BEST SELLING TRUCKS:

"CHEVROLET TRUCKS . . . STAND OUR HEAVY LOADS YEAR AFTER YEAR WITHOUT EXCESSIVE REPAIR BILLS"

. . . says Mr. F. B. Simmons, traffic manager, Western Division, National Yeast Corporation—a typical user of Chevrolet light-duty trucks.

"We found that Chevrolet trucks will stand our heavy loads year after year," Mr. Simmons states, "without excessive repair bills." And he points to the fact that "everyday operating costs are also low. That's the reason we are switching to all Chevrolets in our Chicago District."

Everywhere in America today, you'll find Chevrolet truck owners echoing Mr. Simmons' words . . . saying, in effect, "Chevy puts more money in my pocket!" These great-performing trucks, the sales leaders since '37, now boast the biggest, happiest family of owners to be found anywhere. Why not see your Chevrolet dealer and join 'em soon! . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

***Modern features* make new Chevrolet trucks the Performance Champs of the Lightweight Class!**

New high-powered V8's—with efficient, moneysaving short-stroke design!

Extra high-compression 6's—the world's most popular truck engines!

Easy-wheeling Ball-Gear Steering—for fleet, agile maneuvering, less work at the wheel!

Modern Panoramic Windshield, Concealed Safety Steps . . . and many, many more!

CHEVROLET

NEW CHEVROLET TASK·FORCE TRUCKS

Anything less is an old-fashioned truck!

Saves on label imprinting!

Now, you can substantially cut imprinting costs, reduce label inventories, prevent waste of unusable pre-printed labels. The Tickometer is truly a big money saver. With it, you can imprint sizes, weights, colors, flavors, dates, code and control numbers on your product labels—as you need them for current production. No excess stocks.

The Tickometer imprints an area 2¾ by ⅞ inches at speeds up to 1000 pieces a *minute*. It can handle a wide variety of paper and card stocks in sizes from 1 by 2 inches to 15 by 15 inches, depending on the model. It feeds, counts and stacks automatically, with complete accuracy. And it can be easily used by anyone, requires no special training.

Other uses include marking, coding, imprinting various other paper items such as checks, coupons, sales slips, tags, tickets, transfers, etc.

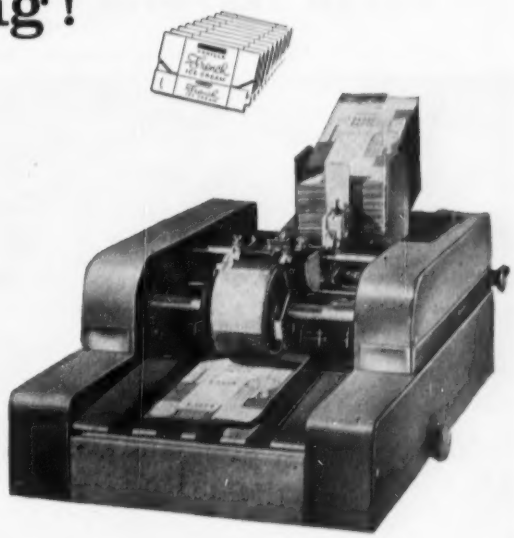
So accurate, banks use it to count currency!

Saves on package imprinting!

Imprint your folding cartons and other containers in just the quantities you need for current production. Eliminate wasteful pre-printing, reduce inventories, cut packaging costs—*save!*

With the new PB Package Imprinter, you can imprint sizes, weights, colors, dates, trademarks on cartons, bags, envelopes at speeds up to 7500 pieces an hour. It even imprints on your dealer literature.

Anyone can easily operate the Imprinter without special training, adjust it *without tools*. Its printing area is 4 by 18 inches. Uses rubber mats, or type from 6 pt. up. Handles paper or board materials in sizes from 2½ by 2½ up to 18 by 18 inches—in most any finish and in thicknesses from .010 to 3/16 inches. Also prints on most plastics, cellophane, foils, etc. Liquid ink, needs no mixing, dries instantly. Has automatic power stacker. Service from 289 points, coast to coast.



Learn how these aids can help your business! Call the nearest PB office for a demonstration. Or send coupon for free illustrated booklets and case studies.

Pitney-Bowes

Originators of the postage meter... offices in 94 cities in U.S. and Canada

Pitney-Bowes, Inc
3843 Walnut Street
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Send free booklet on ☐ *Tickometer* ☐ *Package Imprinter to:*

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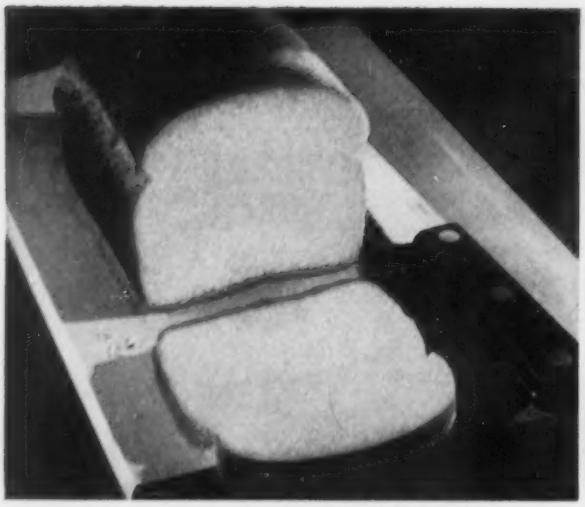

Sugar is the key to wheat flavor in bread. And of the basic sugars that nature provides, many bakers have discovered that Cerelose brand dextrose—the sugar made from corn—produces more of the finer flavor overtones in baked bread than any other sugar.

Preserving the piquant flavor of tomato products, Cerelose brand dextrose is a reducing sugar that will not mask delicate spice flavors with sweetness. Also, by retarding oxidation, Cerelose increases the shelf life of the natural red tomato color.

To boost flavor...without over-sweetness... more and more food processors are using

CERELOSE®
BRAND DEXTROSE

THE SPECIAL SUGAR THAT DOES SPECIAL THINGS FOR FLAVOR IN FOODS

All too frequently, true fruit flavor is masked by the sweeteners in the preserving syrup. When syrup concentrations must be increased to prevent bacterial spoilage and retain the fruit's fine texture, Cerelose brand dextrose sugar is used to protect the flavor . . . without over-sweetness.

Cerelose brand dextrose sugar is more than just a sweetener here. It accentuates the presence of butterfat to produce the kind of richness Americans like in ice cream. Also, in sherbets and ices, Cerelose allows the manufacturer to increase body without increasing sweetness.

Our technical staff welcomes the opportunity to show you why you should use Cerelose brand dextrose sugar in your formula. Call us today.

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CORN PRODUCTS REFINING COMPANY
17 Battery Place, New York 4, N. Y.

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VALUABLE NEW BOOK

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INDUSTRIAL QUALITY... FRACTIONAL H.P. ELECTRIC MOTORS

Right at your desk, make a detailed inspection of Century's Fractional H.P. single phase and polyphase line of motors, designed to latest NEMA standards! This fact-filled new book gives you the comprehensive story on Century's *new* 48-Frame and 56-Frame INDUSTRIAL QUALITY Motors... tells how and why they're *better performers* than the older models, why they weigh less, take less space, are easier to handle.

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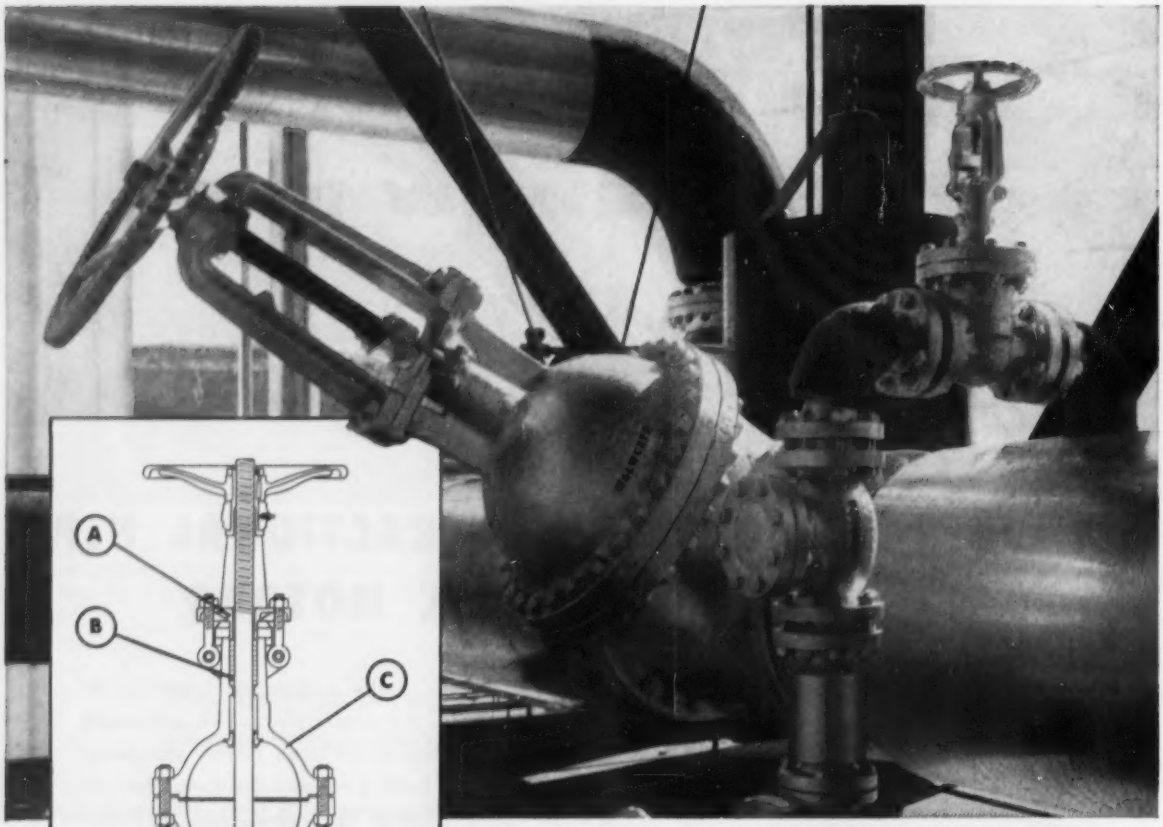

Walworth Series 150 and 300

CAST STEEL GATE VALVES OFFER YOU THESE FEATURES

for 'round-the-plant service

(A) GLANDS: Clearances between the gland and stuffing box, and gland and stem, are such that the stem cannot be scored even if the gland is pulled down unevenly.

(B) DEEP STUFFING BOXES: More than adequate in all sizes (2" to 24") to assure tightness and maximum packing life.

(C) BONNETS AND BODIES: Engineered to exceed the requirements of all applicable codes and standards. They are tough, durable, dependable.

(D) INTEGRAL GUIDE RIB FACES IN BODY: Machined to insure accurate centering of the gate.

(E) STURDY SEAT RINGS: Bottom-seated so that no recess exists at the back of the ring to cause turbulence, erosion and pressure drop.

(F) STREAMLINED PORTS: Permit unobstructed flow which results in minimum pressure drop and reduces the possibility of erosion.

Walworth Cast Steel Gate Valves can be furnished with either flanged ends or butt welding ends. Roller bearing yokes are available on the larger sizes. On valves 4 inches and larger, by-passes can be furnished. Walworth Cast Steel Gate, Globe and Check Valves from Series 150 to 2500, are available. For Series 600 and higher, we recommend Walworth Pressure Seal Cast Steel Valves. See your Walworth Distributor or write to Walworth for complete information.

WALWORTH

60 East 42nd Street, New York 17, New York

SUBSIDIARIES: ALLOYED ALLOY STEEL PRODUCTS CO. CONOFLOW CORPORATION M&H M & H VALVE & FITTINGS CO. SW SOUTHWEST FABRICATING & WELDING CO., INC. WALWORTH COMPANY OF CANADA, LTD.

LITTLE GIANT FOOD CONVEYOR BELTS

The right color means easy picking–

food inspection is more efficient with these colorful "U.S." belts

More and more, the food processing industries recognize the value of conveyor belts whose color allows rejectable items to be easily spotted during sorting and inspection. With new U.S. Little Giant food conveyor belts—in color—imperfect food or packaging "pops out" to the eye, makes inspection easier and quicker. Workers' eye-strain and eye-fatigue are lessened; plant morale and appearance are given a lift.

These colorful belts are resistant to food oils, acids and greases, to alkaline detergents and to moisture. They stay flexible over a wide range of temperatures. They are non-porous, odorless, non-contaminating and easily cleaned.

There's a complete line of belting for any conveyor need—plus factory-trained engineers to service you—at all 28 "U.S." District Sales Offices. Or write Mechanical Goods Division, United States Rubber, Rockefeller Center, New York 20, N. Y.

Mechanical Goods Division

United States Rubber

Tear out for handy reference when ordering

LITTLE GIANT FOOD CONVEYOR BELTS

Little Giant Food Conveyor Belts in Color bring new efficiency, higher working morale

GENERAL FEATURES

1. **Non-porous synthetic cover is resistant to food oils, greases.**
2. **A selection of colors permits higher operator efficiency and results in less fatigue.**
3. **Belt is easy to clean and keep sanitary. Resistant to alkaline detergents and moisture.**
4. **Extremely flexible over small pulleys.**
5. **Maintains flexibility at sub-zero temperatures; maintains stability at temperatures in excess of 212°F.**
6. **Economical in price and performance in comparison with conventional heavy duck constructions.**
7. **Odorless, tasteless, non-toxic, non-contaminating.**
8. **Special fabric and edge treatment seals belt from damaging moisture and food acids.**

SIZES & CONSTRUCTIONS—Available in widths from 6" to 48". Stocked in 1/32" thick top cover by friction surface bottom, in 3 and 4 ply. Other cover thicknesses or friction surface available on request.

COLORS—Ideal for packing and inspection lines wherever greasy or abrasive material is handled, colors include EYE-EZE GREEN, BURNT ORANGE, WHITE, BLACK.

These colors cut down on eye-strain and eye-fatigue, improve workers' efficiency, and "dress up" your plant. The choice of belt colors permits you to *complement* the material being conveyed (so that rejectable items stand out) — or the colors may be used to *contrast* with the material being conveyed (so that all the items stand out boldly).

CARCASS—Carcass is made from specially-designed lightweight duck with high quality frictions of the same color as the cover. Rated at 15 lbs. per inch per ply maximum operating tension — a very efficient strength for light conveyor service. Excellent fastener holding ability.

Make the nearest "US" District Sales Office your supply point—not only for Little Giant Food Conveyor Belts—but for *all* your belting requirements. Factory-trained engineers are there to serve you. Contact the office nearest you—or write us at Rockefeller Center, New York 20, N. Y.

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Buffalo 3, N. Y.
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706 Morris Street

Chicago 32, Ill.
4135 South Pulaski Road

Cincinnati 37, Ohio
4921 Para Drive

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7208 Euclid Avenue

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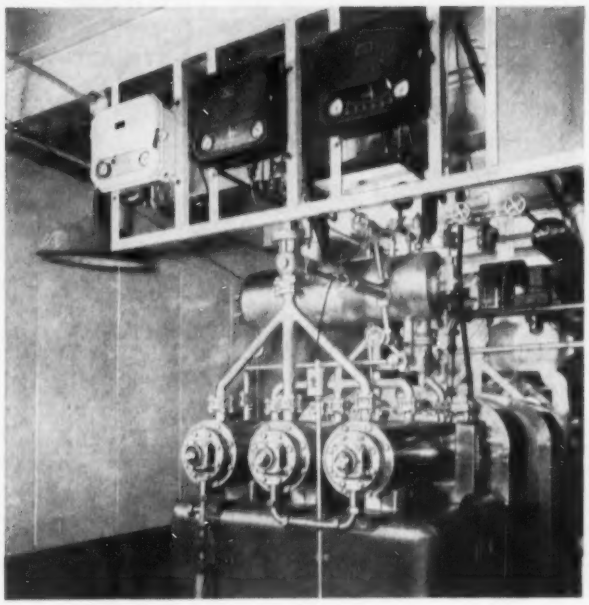
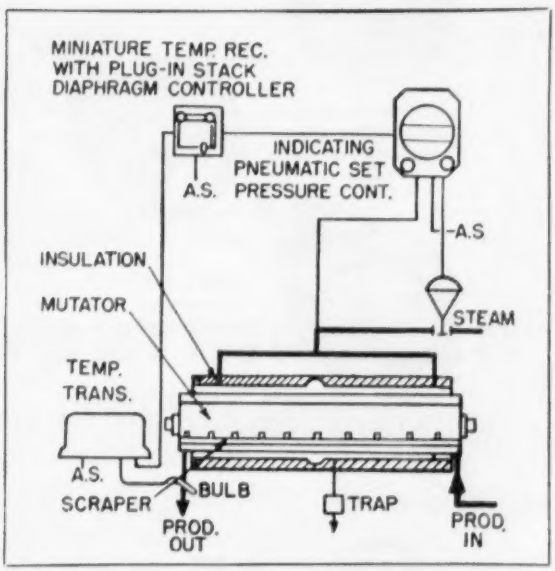
Mechanical Goods Division

United States Rubber

Taylor helps them concentrate

at PASCO PACKING COMPANY





Alternate system using TRI-ACT Controller which plugs into back of miniature recording receiver.

WITH this Taylor control system on their Slush Freeze Votator, Pasco Packing Co., Dade City, Florida, protect their fine reputation for top quality citrus concentrates. It gives them extremely close outlet temperature control and requires the very minimum of operator attention.

The TRANSAIRE* Temperature Transmitter contains SPEED-ACT* response, which compensates for the poor heat transfer from product to bulb. Transmitter output is therefore directly proportional to the product temperature change. Output from the transmitter actuates a dependable, accurate FULSCOPE* Indicating Controller. This system is applicable to the processing of all viscous liquid and concentrated food products.

System shown in drawing at left includes refinements such as the Pneumatic-Set Controller which reduces substantially the upsetting effects due to load changes, and also permits limiting the maximum allowable pressure of heating or cooling media. The miniature Transet Temperature Recorder serves as a mounting for the plug-in TRI-ACT* Controller which provides superior control without over-peaking on start-up.

Call your Taylor Field Engineer for further details, or write Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada.

Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.

*Reg. U.S. Pat. Off.

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

For more data, circle this page number on card at front →

Pump standardization

1 YOUR CHOICE OF MATERIALS OF CONSTRUCTION

All iron

All bronze

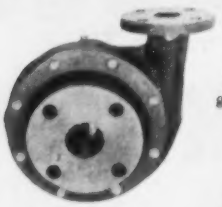
All Worthite

Iron with bronze impeller and trim

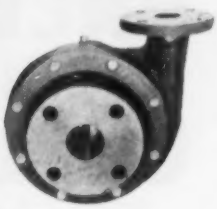
Steel with iron impeller and trim

Steel with bronze impeller and trim

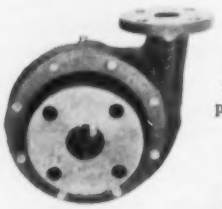
2 YOUR CHOICE OF LIQUID ENDS



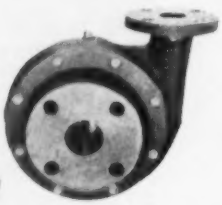
With closed impellers for general service



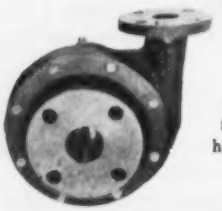
With open impellers for general and abrasive services



With closed impellers for process service



With open impellers for corrosive services



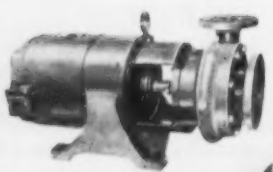
With closed impellers for hotwell service

3 YOUR CHOICE OF SHAFT SEALING METHODS

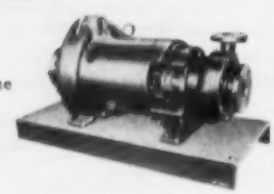
Stuffing box

Mechanical seal

4 YOUR CHOICE OF DRIVES

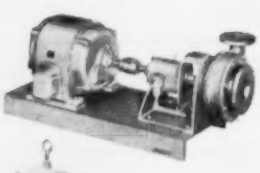


Monobloc Motor



Monobloc Turbine

CLOSE-COUPLED



Direct Motor Drive

Direct Turbine Drive

Belt Drive

FRAME-MOUNTED

Choose from 70,480 combinations. Worthington's SESC—Standard End Suction Centrifugal—line allows you to "custom-build" your pump from stock parts. In each of the 120 sizes, you have a choice of materials of construction, types of liquid ends, shaft sealing methods, and drives. Because the SESC line is built from standard, stocked parts, you get prompt delivery at competitive prices.

slashes inventory, reduces downtime, cuts maintenance

...yet gives you 70,480 combinations to choose from

STANDARDIZE AND SAVE! NOT SOMETIME IN THE FUTURE, BUT NOW!

With Worthington's SESC–Standard End Suction Centrifugal–line, you can cut your warehousing and inventory costs as much as 50%, greatly simplify pump maintenance, and reduce downtime.

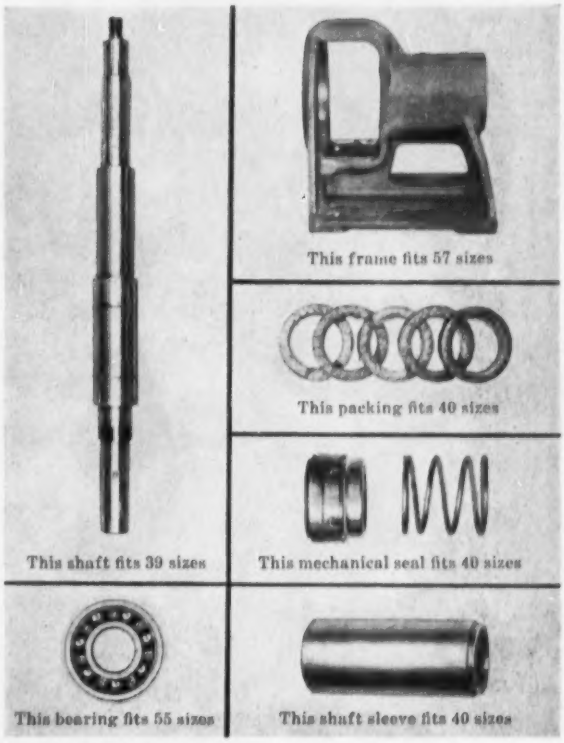
You get these benefits *without* sacrificing flexibility. In fact, the SESC line gives you an even broader selection. Because *parts* have been standardized and not *pumps* you can literally "custom-build" your pump to get exactly the right features for your particular application.

The complete Worthington SESC pump line consists of six separate types, all suitable for either motor, turbine, or belt drive. Ratings range up to 2700 GPM and 230 ft. head. Pumps and spare parts are available from field stock in all strategic areas as well as from the factory.

If you'd like to know more about the SESC line, write to Section PC61, Worthington Corporation, Harrison, N.J. In Canada: Worthington (Canada) 1955, Ltd., Toronto, Ont.

PC-6.1

WORTHINGTON

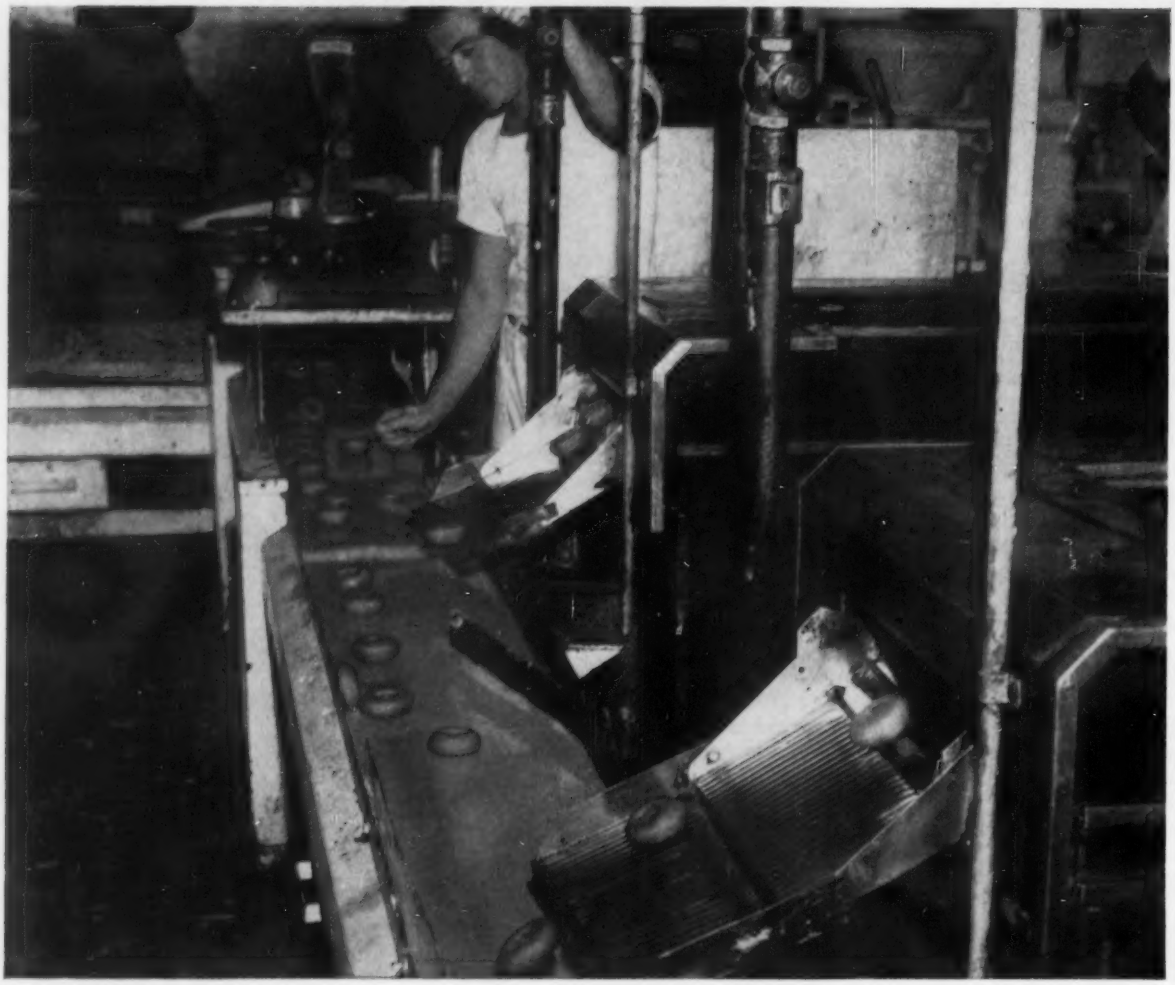

This frame fits 57 sizes
This packing fits 40 sizes
This shaft fits 39 sizes
This mechanical seal fits 40 sizes
This bearing fits 55 sizes
This shaft sleeve fits 40 sizes

Slashes parts inventory. You can cut inventory costs as much as 50% by standardizing on the SESC–Standard End Suction Centrifugal–line. In the 120 sizes in the complete line, many, many parts are interchangeable. As shown here, one shaft is used in 39 sizes, one bearing in 55 sizes, one frame in 57, one packing in 40, one mechanical seal in 40, and one shaft sleeve in 40 sizes.

Reduces downtime. Parts interchangeability can mean big savings. When repairs or conversions are necessary, standardization can often drastically cut downtime. For example, all SESC pumps can quickly be converted from packed stuffing box to mechanical seal and vice versa using *stock* parts.

Cuts maintenance. If you know one SESC pump, you know them all. From the smallest to the largest the entire line is built to the same basic design. Maintenance men quickly become familiar with construction details. Their work is simplified and maintenance costs greatly reduced.

B.F.Goodrich



Out of the hot fryer and on to easy-to-clean Koroseal belt

B. F. Goodrich belt has no odor, no taste, never gets rancid

AT THIS bakery, fresh doughnuts used to be carried from fryer to packing tables on a woven cotton belt. But cooking oil clinging to the doughnuts stained the belt, made it impossible to keep clean. Some belts would last six months, others only three.

Then the Koroseal belt in the picture was tried. Because it's made of Koroseal flexible material, this B.F.Goodrich belt stands cooking oils, animal fats, most acids—and it stands hard use, and just about everything else that ruins most belts.

Food particles can't grind into Koroseal's smooth, polished surface. That's why this belt is such a cinch to clean. Just a quick wipe with a damp cloth and detergent, and the Koroseal belt is as clean and new looking as ever. And since Koroseal, is waterproof, the belt never gets damp or soggy, and so can be used right after washing.

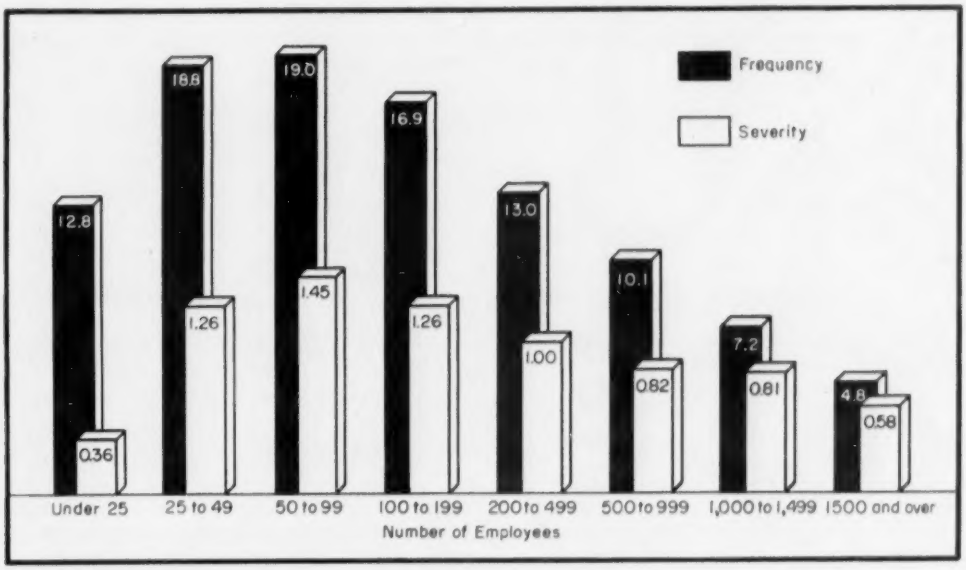
Koroseal resists cracking and peeling, never gets soft or sticky. And, of course, there's no danger of contamination with Koroseal—it has no odor, no taste, never gets rancid. The Koroseal belt shown here has been in service over a year now, and the bakery superintendent says it is in excellent shape.

Get in touch with a B. F. Goodrich distributor and let him tell you more about the line of belts developed by B. F. Goodrich for the food industry. *B. F. Goodrich Industrial Products Company, Dept. M-744, Akron 18, Ohio.*

Koroseal—T. M. Reg. U.S. Pat. Off.

B.F.Goodrich

INDUSTRIAL PRODUCTS



INJURIES are much more frequent and much more severe in plants with medium- and small-size personnel. (National Safety Council figures were used in preparing this bar chart.)

Why Accident Costs Run High

And What You Can Do About It

If your employees number under 500, you're definitely "on the safety-trouble spot." But you can effectively work to get off it—by following recent findings that distinguish the prime causes of plant accidents and indicate effective ways to reduce them

FE STAFF

THOSE WHO HAVE PERSONALLY experienced accidental injuries know how costly they can be—always in discomfort, sometimes in permanent handicap, and more often than not in dollars.

The yearly monetary loss in this country from all accidents—gaged as numbering approximately 10,000,000—has been variously estimated at $9 to $10 billion.

Of this cost, manufacturing industries shell out a whacking big share, stated to run yearly from $45 to $50 per worker. And viewed from the standpoint of all costs, including intangibles, this per-worker estimate no doubt is quite conservative.

Through safety precautions and devices, education, programming, etc., lost-time accidents are being reduced by an increasing number of plants. A good many have cut them to zero for a full year, and occasionally for even longer. Pertinent questions then remain:

Where in the manufacturing industries are the heavy accident losses incurred—the ones that account for the high average cost? *Why* do they occur? And *how* can they be reduced?

Many studies have centered upon accident frequency and severity rates of plants according to number of workers. In general, these investigations have revealed that plants with less than 500 employees run higher in severity and frequency of accidents than do plants of more than 500.

To the contrary, however, the extremely small plants with less than 25 workers often prove exceptions, showing better than average freedom from accidents.

Specifically, the savings potential in the food industry, wherein are numbered approximately 10% of all employees, is greater than in most manufacturing industries.

There are particular opportunities for accident reductions, since the food field ranks near the top in both frequency and severity figures, and also because of our industry's large proportion of medium- and small-size plants. In fact, only some 1% of food plants have more and 500 workers.

And now, why is it that the medium and small establishments are so commonly "accident prones"? Here are a few enlightening indications—

A special questionnaire on safety programming, circulated in by the Associated Industries of Cleveland, indicates that plants in that city have an attitude toward safety

and accident prevention which may closely approximate the national stand.

Whether or not this is the case, the survey did disclose some of the reasons why accidents in medium and small plants are relatively more frequent and costly than those in larger units.

Covering 120 factories (some of them food) employing approximately 82,000 wage workers, the survey showed that more than half of the companies with less than 500 wage employees had no safety programs, while in the smallest of these plants (those with less than 50 workers), only 20% had any type program.

Of those plants in the study with more than 500 wage earners, however, only 3% did not have a safety program.

"Who Done It?"

As might be expected from the lack of programming in so many plants, there was also a dearth of full-time safety directors. Of all plants studied 74% had less than 500 employees and only 3% of these plants had full-time safety directors.

In fact, only 34% of them had *anyone* assigned to safety planning, even part-time. Furthermore, not all plants with more than 500 employees boasted safety directors, the survey finding them in only 60% of the establishments.

Safety records of the individual companies were not reported. However, it is a good bet that they were varied and heterogeneous, in view of the other duties and responsibilities of the part-time "safety directors". The titles ran from "plant manager" down to "foreman" and across the board from "comptroller" through such generalizations as "shop safety committee" and "special projects". Of the 36 titles reported, "personnel manager" was the most frequent.

The amount of time the safety director devoted to his assignment depended, primarily, on whether or not he was full time or part-time. The survey showed the time varied from "100%" down to—believe it or not—"¼%".

Half of these "directors" gave not more than 10% of their schedule to curbing accidents, while only 15% reported devoting more than 90% of their time to safety. All reporting plants with less than 50 employees admitted that their safety directors gave less than 5% of their time to the safety program.

"Pay As You Can"

In general, the results revealed that financing of the accident prevention and safety programming is haphazard. "No budget" was reported by 56%. Only 9% prepared for such costs in their budgets. Among the other means of meeting these expenses, 14% "asked for financing as needed."

As would be expected, amounts in the budgets varied all over the lot—from $10,000 per month down to $25 per month. And budgets were entirely missing from all plants with less than 100 employees.

Very few of those who returned the questionnaire answered this question: "What percentage is the safety budget of the over-all plant budget?" The replies of those who did answer ran from .003% up to 3.5%. The lowest of these percentages is not surprising. However, the 3.5% is a quite sizable allowance—reflecting a strong effort to "do a job."

Compensation Coverage

Employees of 80% of the companies were covered for workman's compensation by state funds; approximately 20% by some self-insured plan. Penalty rating was reported by 10% of the plants, and credit rating by approximately 50%. But neither was reported by the remainder.

Regarding their safety program's worth, 75% stated that their workman compensation costs had thus been lowered, while the remainder reported their programs had not lowered costs.

Unfortunately, of those who reported reduced workman compensation costs, only 30% kept records sufficient to determine the amount of the savings. But the records of these few did indicate in general that both frequency and severity of accidents had been lowered.

Less than half of those who responded answered this question: "Has your safety program resulted in increased production?" Of those who did answer, 70% indicated production increases. But here again there was evidence of scanty bookkeeping—with only about 6% keeping records adequate enough to indicate the production rise traceable to the safety program.

It seems obvious from the results of this Cleveland study that small plants have not yet learned that the cost of safety programming is paid for by the savings garnered through lowered frequency and severity of accidents as well as improved morale and production rates.

How to Curb Injuries

The years have seen many companies and even whole industries go all-out to remove accident hazards through installation of protective devices on equipment and by engineering both plant and equipment for maximum safety. Thus, number and severity of accidents have dropped encouragingly.

But in many plants such "engineered safety" has reached the point of diminishing returns. Today, approximately 85% of accidents are attributable to the human factor. So further accident reduction, particularly in the "safe plant," calls not so much for plant engineering as for *human engineering*.

Accidents result from causes. They don't "just happen" (dictionary definitions to the contrary). In fact, most plant studies reveal that accidents occur to less than one fourth of the specific employees and that, in general, they tend to be repeated.

In short, the more injuries a person receives, the more likely he is to receive more. Such repeaters are classed together as "accident prones."

What To Do with A.P.'s

Though they may not be as numerous as once presumed, it's truly said that "there's always at least one, and often more, in every plant." Traits of this type of person have been recognized. Often, they tend toward being irresponsible, fault-finding, resentful of authority, impulsive, or lacking in purpose. We summarize by cataloging them as "emotionally unstable."

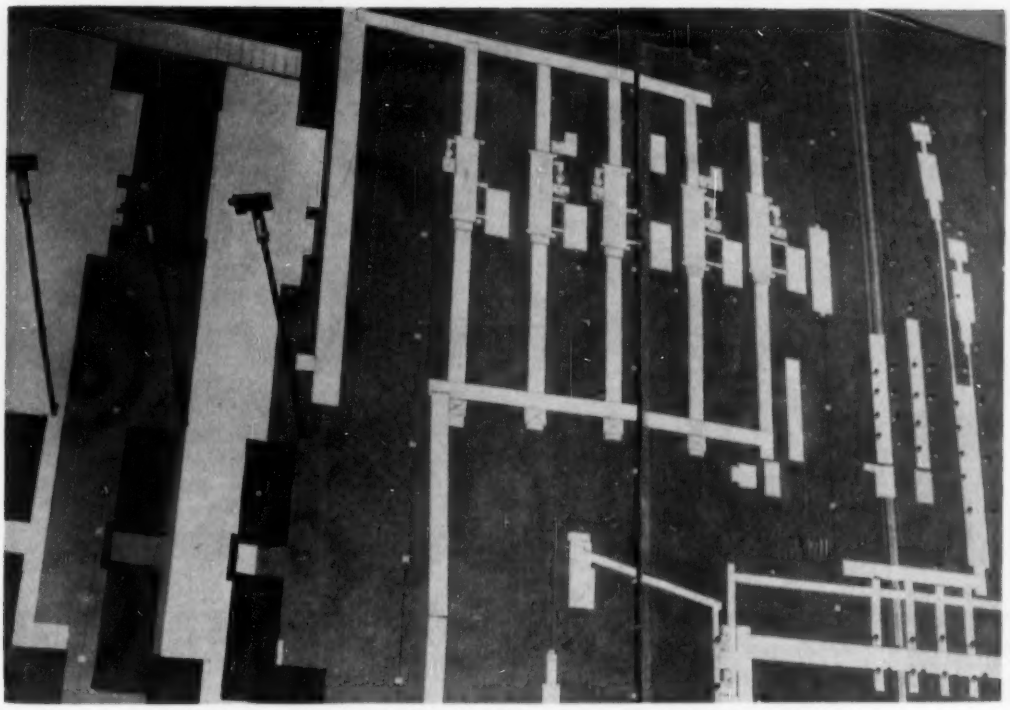
But nevertheless the wheels of industry would be considerably slowed, if not stopped, should they be eliminated from the work force. So, if industry must live with them, then industry must make them safe from themselves.

It can be done. Every plant that hangs up a superior safety record, of many man-hours without a lost-time accident, has licked the A.P. problem—at least temporarily. So some plants certainly have succeeded in removing or blocking off the influences that encourage the emotionally unstable A.P. to "injure himself." Call it "safety education."

Since most accidents are the result of, or made possible by, human feelings and/or human relations, the first step in promoting safety is to recognize that personal liability to accidents is primarily a problem of living.

So says Alan McLean, M.D., Cornell U., in *Personnel*

(*Turn to page 176*)



These Easily Made 2-Dimensional Models

Speed Line Layout, Curb Errors

Machines are cardboard and workers are pins in Seabrook's low-cost miniature system for arranging the most-efficient plant production

FE STAFF

YOU CAN very effectively pre-shape your plant designs and production-line layouts with simple 2-dimensional models—as now demonstrated by the enterprising Seabrook Farms Co., of Seabrook, N. J.

Of course, the many advantages of using finely scaled 3D miniatures is well known. However, the high cost of such accurately constructed models is a pointed consideration.

And this brings attention to the fact that under many circumstances and in numerous plants very satisfactory results can be obtained with the readily made 2D's and at much lower expense.

How To Do It

Here's how Seabrook's engineering department employs 2D cutouts for arranging graphic visuals of prime aid in layout and design:

First, large sheets of corrugated board are obtained to provide sufficient area for encompassing overall plant dimensions on a practical working scale. Usually, a sufficient supply of corrugated board of the sizes needed can be found in stock or in the discards of most food plants.

WHERE FINAL SHARP closeups of specific units are pertinent, the 2D planning may be followed up with careful gaging and positioning of 3D models.

When sufficient horizontal, table-top area is available, the corrugated work surface may be laid out flat.

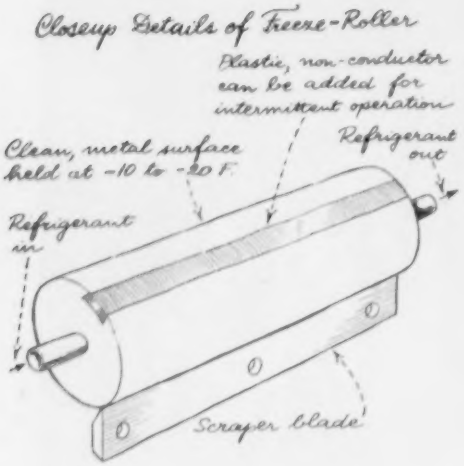
However, it may prove much more advantageous to attach these "plant blanks" to the wall (see photo). They may be mounted either on a permanent or temporary basis.

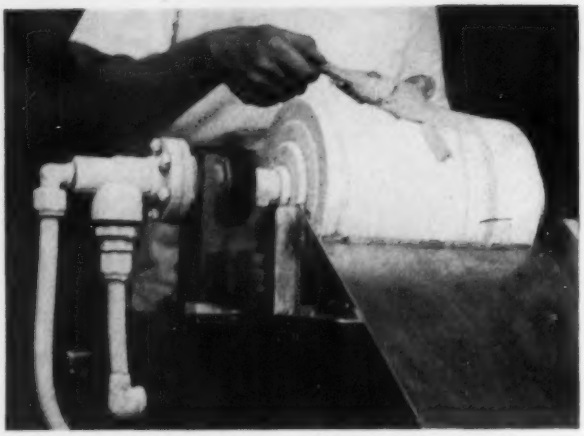
Next, drawn to scale on good quality thin cardboard are plan dimensions of all equipment to be included in the proposed production lines. Identification of the units will be facilitated here if the sheets of cardboard on which the models are to be drawn and cut out are selected in different colors.

When a sufficient number of 2D models of each type and unit of equipment are drawn to scale and cut out, they can then be attached to the corrugated plan board in the correct positions to provide an accurate layout of the newly projected production-line arrangement.

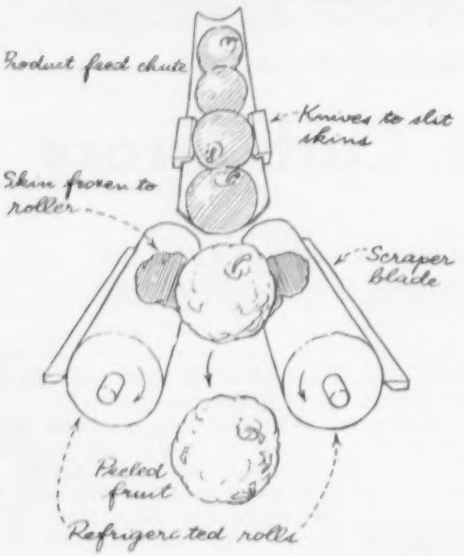
Furthermore, the same procedure

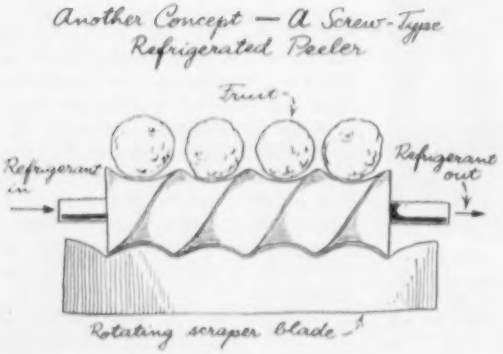
(*Turn to page 96*)


Closeup Details of Freeze-Roller
Plastic, non-conductor can be added for intermittent operation
Clean, metal surface held at -10 to -20 F.
Refrigerant out
Refrigerant in
Scraper blade



CHICKEN SKIN is rapidly stripped from meat with unique, belt-driven, refrigerated drum. But that's not all . . .





Freeze-Grab Units

Faster-acting tools win

NORMAN W. DESROSIER

Professor of Food Technology, Purdue University, Lafayette, Ind.

SELECTIVE FREEZERS—which quickly grab skin, stems, scales, and other unwanted matter from food like a magnet grabs iron—are now ready to slash costs for food processors in many branches of the industry.

For, this latest technique strikes straight at the heart of high-labor operations, such as peeling, trimming, and inspection, by affording big reductions in hand work—or even eliminating it altogether.

Basically, the process involves freezing a moist object to a clean, refrigerated surface, then removing it with a scraper.

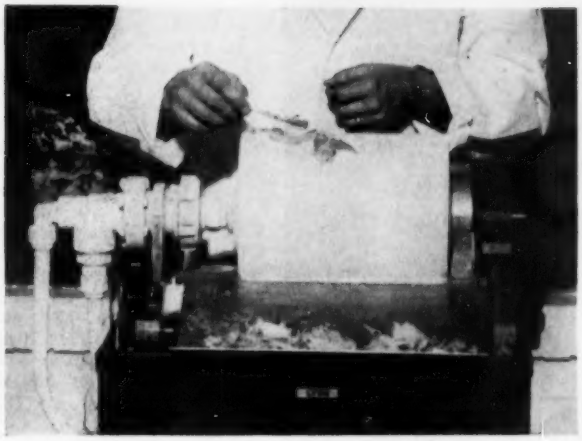
This principle can be applied by means of many sizes, shapes, and types of refrigerated surfaces. We have come up with several effective ones (see sketches) in our experiments, which ranged from fruits and vegetables to fish, poultry, and meat products.

Speeds Skinning, Boning of Poultry

Take the unit function of skinning and boning cooked chicken. We found the most efficient separator for this purpose to be a refrigerated rotating drum, of 8 in. dia. and 4 in. long, with a scraper blade to keep the cold surface clean.

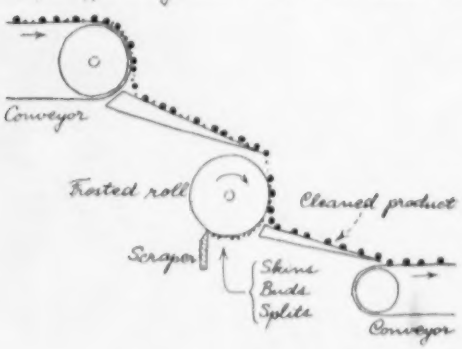
Time and motion studies show that between 12 and 20% of the time necessary to skin and bone a bird, in conventional operation, is taken up by tedious hand removal of skin.

But with our apparatus, skins are peeled from the birds in a mere matter of seconds. Further, well-cooked meat can be quickly stripped from the bones, too, by placing flesh in contact with a second refrigerated drum (see photos).



. . . **COOKED MEAT,** too, can be peeled from bone. Unit uses less than 1 ton of refrigeration under full load

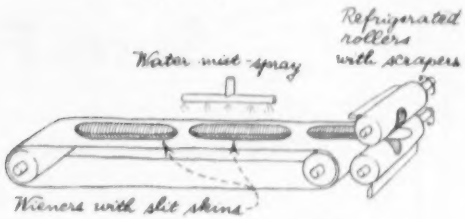
High-Efficiency Pea and Bean Cleaner



Peel and Separate

time and labor savings

Fast Stripper for 'Frank' Skins



Here, a prime advantage from the standpoint of sanitation is that it is not necessary for the operator to touch any edible portion of the chicken.

We figure that six of these refrigerated units and twelve workers can accomplish the same amount of labor as two or three score employees working in the old-style way.

Engineering Data Figured

Heat pickup of the frosted peeler is calculated at 2,000 btu's per hr. on standby, and 4,200 btu.'s/hr. in full operating-load service. These figures were established in a unique experiment that involved continuous application of hot towels to the refrigerated surface.

Thus, under full-load conditions, the refrigeration requirement is less than 1 ton. This keeps costs to a reasonable figure. However, in many food plants, single or even multiple units could be hooked up to existing refrigeration systems at no additional cost.

Best surface temperature for the drum was found in the range between −10 and −20F.

Peels and Sorts Fruits, Vegetables, Meats

The revolving drum can be applied to fruits, vegetables, and meat products in continuous peeling and sorting operations that virtually eliminate human labor.

Using dual rollers and a pre-blanch, freestone peaches, apricots, and tomatoes are easily and automatically stripped of their skins.

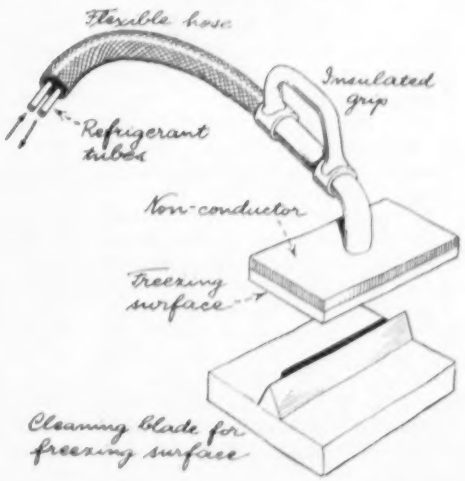
A more complex machine, using a rotating screw and special-shaped scraper, can also be built for this task.

We studied cleaning of peas, too. Here, splits, thistle buds, and skins are most effectively separated by running peas over a frost drum.

Frankfurters can be drum-peeled if skins are first slit,

(Turn to page 228)

Portable Unit Handles Irregularly Shaped Objects



KEY ROLE in effective sanitation program and raw-material quality control is played by Consultant Lorenzo Johnson and Assistant Margaret M. Roddy. Their Chem Food Labs is located in the bakery's headquarters building in Atlanta.

Serious Problems Vanish in . . .

Sure-Fire Sanitation

Triple-check system is directed by top bakery executive, master-minded by outside consultant, and executed by plant sanitarians and committees

FRANK K. LAWLER
Editor, "Food Engineering"

"IT FORMERLY WAS A PROBLEM. Now it's merely routine."

That is how E. J. Bentley, secretary, Columbia Baking Co., Atlanta, sizes up the happy sanitation situation in his firm's 17 Southeastern plants.

In the methods that made plant and product cleanliness just part of an ordinary day's work lies an effective three-way program.

A key factor in the setup is the use of consulting sanitarian Lorenzo Johnson, whose Chem Food Labs is located in the bakery's main plant.

But perhaps even more important is the fact that a top company executive, Mr. Bentley, makes sanitation one of his important responsibilities. It is to him that Mr. Johnson sends his reports and recommendations on each of the plants. It is he that directs plant managers to take corrective action when it may be indicated. And it is he that supervises the competition among the branches for sanitation honors.

Basic, also, in the continuing effectiveness of the program is the good work done by the sanitarian and his committee in each plant. The sanitarian is Johnson-trained, and each week his committee inspects the plant and reports conditions on a prepared form—copies to Bentley and Johnson.

In the weekly report, each branch manager indicates whether items pointed up in the consultant's previous report on the plant have been completed—and if not, why not. Likewise, in respect to the branch's own previous weekly report. On the same form is indicated any evidences of insects, rodents, or poor housekeeping found in the current inspection by the branch sanitation committee, plus actions taken. Sanitary condition of delivery trucks also is noted.

Should changes in equipment or in the building be necessary in the interests of good sanitation, these are reported to headquarters engineers.

On the sanitary committee, the branch plant sanitarian is effectively assisted by the bake shop superintendent, maintenance engineer, garage superintendent, and all department heads. It is up to the sanitarian, of course, to keep the factory tidy, and to see that faulty situations spotted by the committee are corrected. But with a committee made up of men holding key positions in the plant, he has valuable assistance both in finding the faults and in righting them.

Keep Everything Clean

The sanitarian also has a full-time cleaning crew. In the main plant, with 450 workers, there are 8 men on the crew. For the most part, the men are assigned to specific departments, and work during production hours. Only the general cleaning is done at off hours.

Bake shop equipment is cleaned daily. Packaging machines are cleaned of wax (from the wrapping paper) several times a day by the operators.

Every Friday night (or Saturday morning) all elevator boots are cleaned, and the entire blending system is gassed. Wood floors are machine-cleaned with steel wool, then

SURPRISE INSPECTION by consultant spots faults in branch plants. These are indicated on form (right) by underlining items and by notes. At same time, inspector scores plant on each item. Form goes to company executive for action if needed. Scores rate branches in sanitation contest.

COLUMBIA BAKING COMPANY

BREAD PLANT SANITATION SCORE SHEET

DATE _____ BAKERY _____

FEATURE SCORED (Objectional Ones Underscored)	Points Earned	Points Allowed
1. FLOOR STORAGE AREA: Blender, Bins, Elevators, (Bent-Leg-Head) Heels, Hopper, Fundation Procedure, General Clean Up, Dust, Skids, Storage, Light, Conveyors, Sifters, (Floor Scalpings). Grease on floor, ceiling cracks	9.7	10
2. INGREDIENT STORAGE ROOM: Arrangement and/or condition of materials, containers, leaks, floor, walls, ceiling, windows, equipment, screens, employe practices, light.	9.5	10
3. MIXING AND FERMENTATION ROOM: Floor, Sinks, Pipe Insulation leaks, emulsifier, watermat, mixer, scales, Ingredient cans, troughs, bowls, floors, walls, ceiling, windows, screens, dough chute, employe practices, light.	9.8	10
4. MAKE UP ROOM: Dough Chute, divider, rounder, moulder, CREEP bead proofer, benches, conveyors, PAN SPRAYER, bowls, pan trucks, pans, pan racks, floors, walls, ceiling pipes, windows, screens, proof box, ovens, bread cute, vents, cooling box, roll machine, employe practices, light.	12.6	15
5. WRAPPING ROOM: Wrapping machines, slicers, bread boxes, bread racks, storage of paper, floor, walls, ceiling, pipes, windows, employe practices, light	5.9	6
6. TOILETS AND LOCKER ROOMS: Lockers, waste cans, soap, towels, Extender, lavatories, paper, furniture, floors, walls, ceiling, windows, screens, showers, urinals, employe practices.	9.8	10
7. COLD STORAGE ROOM: Mold, odors, containers, floor, walls, ceiling pipes, racks, arrangement.	2	2
8. STAIRWAYS AND HALLS: Floor, Walls, Ceiling, Steps, pipes, windows, & Railings	1.9	2
9. GARAGE: Floor, Walls, Ceiling, Pipes, Windows, Neatness	2	2
10. ENGINEERS SHOP: Floor, Walls, Ceiling, Pipes, Windows, Neatness.	2	2
11. EVIDENCE OF RODENTS FOUND: (Type and Place) mouse droppings IN Upper storage room In _____ In _____	9.8	10
12. EVIDENCE OF INSECTS FOUND: (Type and Place) Four roaches IN make-up, mixing, cookie wrapping room _____	9.7	10
13. OUTSIDE AREA: Walls, grounds rodent holes, garbage incinerators, rodent & insect, proofing of doors and windows.	6.0	6
14. EMPLOYEES: Clothing, Headdress, Hands, Sanitary Practices.	3.0	3
15. LOADING AREA: Floor, Walls, Ceilings, Pipes, Neatness, Trucks.	3.0	3
SCORE	96.7	100

INSPECTOR _____

MANAGER _____

PERIOD END (DW) _____

500 - 3/8/56 AF

WEEKLY SANITATION REPORT

Columbia Baking Company _____ (PLANT)

DATE: _____

I. Chem Food Labs' previous Inspection Report.
Items not completed and reason therefor:
All complete

II. Our previous Weekly Inspection Report.
Items not completed and reason therefor:
Items #2, 3, 4, 5 and 6
Unable to complete without excessive overtime

III. Current Inspection.

A. Evidence of insects and correction applied:
Under Control
Marlate being used

B. Evidence of rodents (rats and mice) and correction applied:
Under Control
Traps and Decon being used

C. Poor housekeeping and corrections applied:
1. Clean and wash wrapping machine
2. Check hinges on doors to dropping room

D. Condition of trucks (list those that need cleaning).
Good

Signed: _____ Manager

CC: Mr. Bentley, Chem Food Labs

Note: Use Reverse Side if additional space is needed.

EJH/bt/1,000-2-6-56

EVERY WEEK a branch sanitation committee inspects each plant and reports conditions to headquarters on form at left. Also indicated is whether recommendations from previous inspections by consultant and by committee have been carried out.

vacuumed, on week-ends. A floor sealer keeps the wood impervious.

So that delivery trucks won't contaminate the products, these are cleaned every Saturday.

Sanitation procedures are specified by the consulting sanitarian, as are insect and rodent control measures. The latter include the use of Marlate insecticide (pyrethrin-type) to whip the flies. Made by du Pont, this powder is mixed with water and applied in truck loading and plant areas as a spray. Its residual effectiveness lasts one to two weeks.

So as not to attract flies, all cans are rinsed thoroughly before being put outside the plant.

Traps and a rodenticide, Decon (used as prescribed by Johnson), take care of rodents. All plant wall openings, including vents, are closed to rats and mice. Rat harbors near the plant are eliminated—even if an appeal has to be made to a city health department to have weeds cut in a vacant lot, or to take care of such problems as that posed by chicken pens at a drive-in grocery.

So well instilled is the fetish for

COLUMBIA BAKING COMPANY
SAMPLE SCHEDULE

Discard any previous sampling schedule which you have on file.

Three copies of this new sampling schedule are being sent to you. Place one copy in a master folder marked "CHEM FOOD LABS - SAMPLING SCHEDULE". Mount the other copy on a board and give to the employee responsible for sample collection.

Collect samples upon arrival of shipments, but send in once weekly after elevator boot samples have been taken. Get samples in mail no later than Saturday morning of each week.

Samples to consist of 1/2 pound each.

Identify each sample bag as follows: Name of product; Name of manufacturer (or shipper); Amount _____ and date _____ Received; Car Initials & Number.

Be sure sample bags are stored in tight containers free from contamination.

Report any unusual circumstances noted in connection with raw materials.

Do not send in samples of any raw materials received from other Columbia plants, as those plants will sample the original shipments.

Send in samples of any contaminated finished products complained about, along with letter of explanation, marking envelope and shipping container in red "FOR SPECIAL ATTENTION".

PRODUCT*	FROM EACH SHIPMENT
X White Bread Flour	3 Samples, one from each of three bags
Cake Flour	3 Samples, one from each of three bags
First Clear Flour	2 Samples, one from each of two bags
Hollywood Mix	1 Sample
Rolled Wheat Flour	1 Sample
X Whole Wheat Flour	1 Sample
Rye Flour	1 Sample
Donut Flour	1 Sample
Hurled Wheat Flour	1 Sample
Special Biscuit Flour	1 Sample
Soya Flour	1 Sample
Potato Flour	1 Sample
Glorize (Corn Flour)	1 Sample
X Powdered Milk	2 Samples, one from each of two bags
Raisins	2 Samples, one from each of two boxes
X White Sesame Seed	1 Sample
X Yellow Sesame Seed	1 Sample
Carsway Seed	1 Sample
Dill Seed	1 Sample
Poppy Seed	1 Sample
Oatmeal	1 Sample
Ground Caraway Seed	1 Sample
X Bread Flour Elevator Boot (Each)	1 Sample from each boot (Show Date Taken)
Cake Flour Elevator Boot (Each)	1 Sample from each boot (Show Date Taken)
Blender Screenings (Greenville,S.C.)	1 Sample Week-Special Outline Already Given
X Bread (Vary with different loaves, rolls, etc.)	1 One pound package each week
Cake (Vary with different varieties)	1 Cake each week(Weight at least ½ pound)

When extra or special samples are requested, please send in promptly.

Samples may be taken by cutting bags triangular, and then seal with tape.

*This is a general sampling schedule sent to all of the bakeries. The products which each bakery is to sample have been checked on your copies. Read your copies carefully, be sure you understand them fully, and then comply with schedule as it involves your specific plant. If you have any questions, let us have them in the beginning.

By: CHEM FOOD LABS
Lorenzo Johnson

Effective 1/1/51

RAW MATERIALS and finished product samples are taken regularly and mailed weekly from branches to lab for analysis in second phase of sanitation program designed to keep customers, FDA, and top executives happy.

sanitation that all employees are on the watch for trouble—like the porter who came dashing into the lab to report that he had sighted a roach on the premises outside.

Checks Plants, Materials

But there's a great deal more to Columbia's sanitation program than goes on at plant level. And it involves the work and counsel of the former F&DA man, Lorenzo Johnson, his long-time assistant, Mrs. Margaret Roddy, and chemist Mary E. Brewin at Chem Food Labs.

This trio does a double-barrelled job. It inspects the plants for good housekeeping and insect and rodent control. And it checks raw materials and finished products to prevent contamination by foreign substances.

At least once every two months, Mr. Johnson makes a surprise tour of each branch plant. And as he fine-combs the place for proper sanitation, he rates the various departments and facilities on a special score sheet. Specific shortcomings are indicated on this sheet, and are pointed out to the local sanitarian, with corrective suggestions. Then a copy of the score sheet goes to Mr. Bentley, who will memo the plant manager regarding what's to be done, and ask for a report when the problems have been handled. Usually, Mr. Bentley finds that the trouble already has been fixed.

It is from the score sheets for all the plants that Mr. Bentley determines the standings in the sanitation contest.

Surprise inspections notwithstanding, this program is not operated as a police and penalty proposition. Plant managers and sanitarians long since have learned to appreciate the value of good sanitation. Now they bring their problems to the consultant rather than wait for him to come to them. It is enlightened cooperation that makes the system work.

Raw Materials Checked

Prevention of product contamination naturally is one of the principal reasons for a good plant sanitation program. But a clean plant is not enough. Raw materials coming into the place must be clean, too—free from infestation.

Here's where the lab serves another important function. Each week it receives for analysis samples of all raw materials purchased by each branch, plus samples of products baked in the plant. The ½-lb. samples are bagged and stored in tight containers at the branches until sent to the lab. Each sample is identified by name of product and name of manufacturer or shipper. Materials not up to specifications are rejected, and a supplier who slips in quality control loses Columbia as a customer.

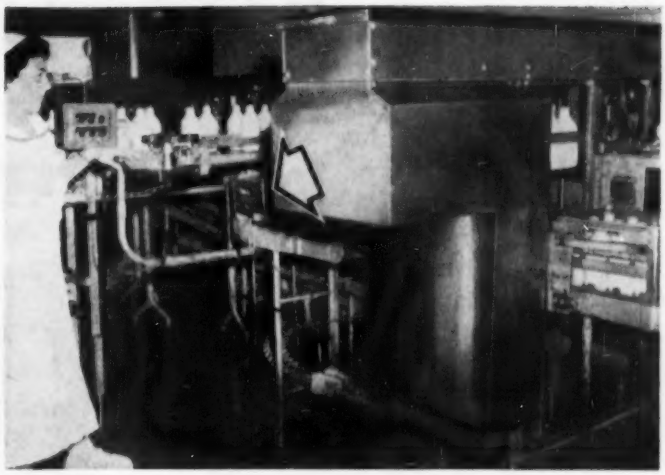
Benefits of this strict continuous control program go even beyond pleased consumers and happy relations with the Food & Drug Administration. For example, the existence of the lab and the program got the bakery a big fruit cake order from a very large distributor.

Consultants, of course, have to be paid. But clean plants and products are worth a lot. Or put another way, the cost of filth can run extremely high, even to ruining a plant's business. And an outside sanitarian, Columbia believes, can be highly effective because he is independent of company pressures and prejudices.

"But," says Mr. Bentley, "you have to keep after sanitation."

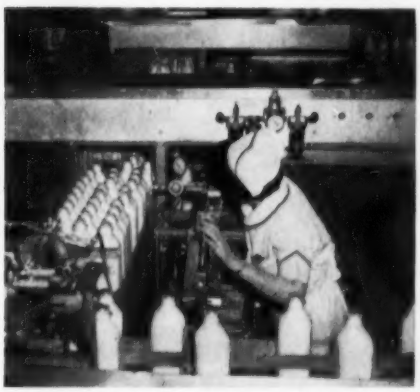
. . . No more room to raise your output?

Supplee Solves It With Big Washer, Robot Casers



BOTTLES move from filler to caser on conveyor (left). Empty cases enter underneath (arrow). Filled ones discharge at right.

These units enable dairy to fill half-gallon bottles as well as quarts—zooming production, saving space, cutting work fatigue



CLOSEUPS SHOW ACTION. Left: Filled bottles are formed into three lines, then are assembled in twelves. Right: Fingers (arrow) lower bottles into cases, which then move to conveyor.

ARTHUR V. GEMMILL
Senior Associate Editor, "Food Engineering"

SOONER OR LATER, you're sure to run into this tough problem—

Your production and/or packaging operations must be stepped up. But—you simply haven't got, and can't get, the extra space to handle it.

Such was the situation at Supplee-Wills-Jones Milk Co. when, along with other processors in Philadelphia, the company decided to start distributing milk in half-gallon glass bottles. Previously, the quart size had been the largest used.

When this sort of exigency is encountered in inflexible plant space, it boils down to attempts to get more efficient integration of operations, improved methods of handling and, usually, installation of new, higher-speed equipment.

Washer Hurdle

Supplee's Tabor Road plant is one of the most modern and efficient large-scale units in the country (*Food Industries* July '51, p. 60). In its design, much thought was given to comfort of the workers. This resulted in a compact arrangement of equipment in the processing room that minimized walking by operators in the performance of their tasks.

The glass filling operation comprised three separate lines, each with its own 16-wide bottle washer and 130 bpm. filler. The fillers could easily be converted to handle half-gallon bottles in addition to quarts. But the washers were built to accommodate no bottles larger than quarts, and there was no space available for installation of a new two-quart unit.

A possible solution was to remove two of the 16-wide washers and install a combination half-gallon and quart washer that was large enough to supply two fillers. Trouble was, there wasn't such a unit available.

Consultations between Supplee's engineering and production departments and the Geo. J. Meyer Mfg. Co. resulted in a decision to build a washer that would hold 24 bottles (half-gallon or quart) in a row. This was to replace two of the original 16-wide units.

This unit is now in operation, and it is supplying the two filling lines at quart speeds of 240-260 per min. and half-gallon speeds of 150 per. min.

Automatic Casers, Too

Still another problem posed by the half-gallon bottles was that of casing these larger units. Previously, all products were hand packed from special accumulating tables located between the fillers.

On the half-gallon lines, the company decided to install automatic casers. Adopted were the new Mapes automatic casing systems (Cherry-Burrell Corp.). Unique features of these are employment of rising "fingers" which come up under each bot-

(Turn to page 96)

MIT Food Professors Answer

'Frozen Quality—

Bernard E. Proctor

John T. R. Nickerson

Marcus Karel

Augustus L. Hesselschwerdt, Jr.

Time and temperature are top enemies, say Massachusetts Institute of Technology researchers. And they "put their fingers" on present frozen-distribution hot spots—causes of major deterioration problems—to help men from Super Market Institute

ROBERT J. KELSEY
Assistant Editor, "Food Engineering"

PROBLEMS THAT CHALLENGE frozen food packers were spotlighted at a unique seminar conducted recently in Cambridge, Mass. Here, members of Super Market Institute's Frozen Food Productivity Committee sat down with professors of Massachusetts Institute of Technology to find out what effect storage time and temperature have on quality of frozen foods.

This trail-blazing researcher-marketer session was sponsored by Gorton's of Gloucester, a seafood freezer, and was moderated by Fred E. Zeuch, Chairman of the SMI Committee. An audience of about 200 food brokers, distributors, and retailers from across the nation showed its eagerness for facts by bombarding the researchers with many additional pertinent questions.

Particularly, some alarming truths were revealed about excessive distribution-channel temperatures—which should be of immediate concern to all frozen food packers.

The dangers were graphically pointed up by John T. R. Nickerson, MIT Associate Professor of Food Processing.

Ice-and-Salt Cars Not Good

Starting with transportation difficulties, he said "USDA experiments have shown that the ice-and-salt railroad car will not maintain temperatures low enough to protect frozen foods."

Preparatory to a test run with such a car from Oregon to New Jersey (running time, 104 hr.; standing time, 113 hr.), product was loaded at 0 deg. F., with air temperature in the car at this time at 15F. During the run, however, outside readings ranged from 62 to 95F, and temperature in the car rose, at times, to a high of 28F. On arrival, the load was at 22 deg.

"This makes it evident," said Dr. Nickerson, "that the best performance to be expected from ice-and-salt cars is in the range above 15F.

"Mechanically refrigerated cars, on the other hand, will maintain 0F. or below. But there are only 930 of these cars in use today, (950 more being on order). Our total of frozen foods cannot possibly be transported in so few

This Query of Group From SMI

How Protect It?'

cars. Thus, we can expect little help from this quarter.

"Tests show that trucks used for long-distance transport can provide adequate refrigeration—but many do not. Hot spots as high as 16-18 deg. can usually be found in these loads.

Moderator Fred E. Zeuch

"Hot" Trucks and Storage

"Trucks delivering from warehouses to retail stores usually employ hold-over plates, dry ice, or a combination of the two. Air temperatures in these carriers have been found to average 36F.—much too high for good results. Furthermore, these trucks are often loaded at night for morning delivery. Thus, frozens may be exposed to high temperatures for up to 12 hr.

"Average product temperature on arrival at the store is found to be 10F. Again, this is too high to prevent loss of quality. Moreover, high arrival temperatures place an overload on retail refrigeration equipment—machinery that is least able to take care of an overload."

Turning to distributing warehouses, Dr. Nickerson declared that "most public warehouses do keep temperatures at 0F. or below. But a recent survey shows that 10 to 15% maintain unsatisfactory temperatures around 15 deg.

"And there are gross temperature mispractices in order-assembly and break-up rooms. These have been found to range all the way from −6 to 40F., with products exposed under these conditions from 1 day to 40 weeks.

"Frozen food storage rooms in retail stores have been found to average 5.5F., he said, but range from −11 to 37 deg. Again, retail cabinets average 0 deg. at the bottom, but 7F. at a point 2 in. below the load line."

Dr. Bernard E. Proctor, Head of MIT's Food Processing Department, cited examples where storage time of frozens in *unrefrigerated* backrooms ranged from 1 to 6 hr., and where "supposedly *refrigerated*" storage areas were actually kept at 39F.

"About 30% of the retail cabinets surveyed were," he said, "loaded above the safe line."

High-Temperature Effects

Just what these bad distribution practices mean in terms of product quality was spelled out by the MIT'ers with recent research data.

Said Dr. Nickerson: "Cod fillets held at temperatures as high as 10F. become unacceptable in a 4-month period. The flesh undergoes drastic changes in texture and flavor. And taste-test scores drop to 50% of the maximum value in only 6 weeks.

"In contrast, storage at −10F. produces little change

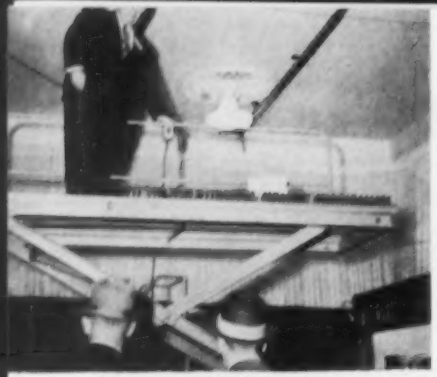
(Turn to page 96)

Seymour L. Seleznow

Harold Kline

Louis B. Smith, Jr.

Gerritt Vander Hooning



DUAL-PURPOSE hydraulic-lift platform permits production or maintenance work at high levels with speed and safety. For power there's ¼-hp electric motor with extension cord and plug. Leveling jacks provide firm foundation. Double rack and pawl hold handrail platform at working height. Contracts to 5 ft. and expands to 10 ft. Capacity 1,250 lb.—Ballymore Co., Wayne, Pa. (52A)

35 Improved Materials

Better performing, easier serviced product

NEARLY 2,000 pieces of equipment—along with the latest techniques in handling methods for cutting costs and raising productivity—were demonstrated by some 160 manufacturers at the recent Material Handling Institute's Exposition in Cleveland.

Exhibitors in this field, which has grown to a $1 billion business since World War II, showed equipment worth over $4½ million, spending better than $1 million on display alone.

Big accent was on equipment for plant, warehouse, and factory-yard use. Covered were more than 34 basic types of mechanical handling units, ranging from auxiliary and special handlers through conveyors, lift trucks, hoists, monorails, and other facilities.

Noted were lift trucks with shorter turning radii, speedier lifting action, power steering, automatic transmis-

4 New Hoisting Units

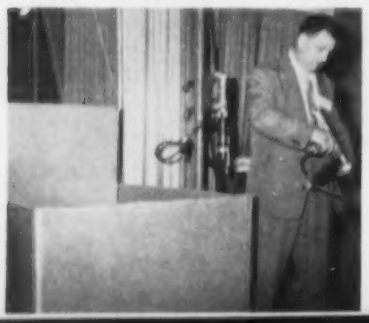
SAFE, sanitary, rugged cable-type electric hoist has 25-fpm. lifting speed. Unit is fully enclosed, dirt-free, easy to maintain, minus slack chain, and free from oil drip, since it's permanently lubricated. Features automatic spring-set shoe-type motor brake for instant, accurate load positioning, also heavy duty Weston type friction-load brake actuated by ratchet and pawl.—David Round & Son, Inc., Cleveland. (52B)

FOR POSITIVE SAFETY, this new small electric hoist has dual braking. Automatic regenerative electric braking safety sustains descending load. Mechanical friction brake safely locks stopped load, power interruption automatically setting it to hold load securely. Sealed-in, lifetime lubrication protects rugged unit.—Chisholm-Moore Hoist Div., Columbus McKinnon Chain Corp., Tonawanda, N. Y. (52C)

TO DEMONSTRATE minute adjustment in "eddy current" braking, a 1,000-lb. weight is lowered onto a fragile goblet. For this super-sensitive braking, 1-ton winch was employed with electric monorail-type hoist. Motor-braking principle is applicable for gentle hoisting and lowering. Brake provides positive, accurate control from no-load to full capacity—Yale & Towne Mfg. Co., Philadelphia. (52D)

3 "Handlers"

EXPENDABLE CONTAINER is formed in few minutes, employing 75-140-psi. air-operated stapler adjustable for use on hardest woods. Here, device makes 1,500-3,000 lb. capacity unit (with or without bottom) by securing ½-in.-thick corrugated board to pallet. Stapler maker: Powers Wire Products Co., Monterey Park, Calif. (52E)



STAINLESS STEEL SKID (13 gage) has special applicability in such food branches as meat-packing. Unit 36x 54 in., readily takes such loads as 1,800 lb. of bacon slabs. Sanitary-designed and BAI-approved, skid has durable finish, no corners, and easily accessible surfaces for cleaning.—Republic Steel Corp., Cleveland. (52F)

RACK FOR HEAVY DUTY is easy to install and take apart in any area. Gravity rollers, wheel conveyors, or slides can be used, depending upon size, weight, and nature of item handled. Pallet storage (shown here) is accomplished by adding pallet beds to uprights. Maker: Lok-Rak Corp., East Hartford, Conn. (52G)

Handlers, Auxiliaries

movers displayed . . . M-H leaders cite strides

sion, new safety features, and facilities for easier maintenance. And there was a comprehensive display of special attachment for these trucks.

Conveyors featured latest safety devices and electronic controls. Shown, too, were the newest models and integrated systems. Also, pushbutton-controlled hoists of new sensitivity.

Major 1956 refinements in industrial trucks, bringing safer operation and simpler maintenance, were hailed by Sheldon K. Towson, president of the pioneer firm, Elwell-Parker Electric Co.

He particularly emphasized the importance of maximum ease of maintenance due to the factor of costs.

Today's trucks, he pointed out, provide the heart of handling systems in many large companies. Handling great loads and lifting to new heights, they are a far cry from the first model, which provided only for powered travel in a horizontal plane.

Meantime, the trend will go on toward reducing overall dimensions of trucks without cutting capacity, since there is a continuing demand for handling heavier and heavier loads without sacrificing any storage or working areas for additional travel space.

Improvements in handling promise a tremendous future through contributing toward lower overall production costs. So stated Roger Tewksbury, president of Oster Mfg. Co.

Here, he said, we find the last major means of aiding industry to escape from the squeeze between increasing labor and material costs and selling prices. (*Turn to page 152*)

3 of Latest Truck Ramps

FULLY AUTOMATIC RAMP is completely truck-actuated. And counterbalanced for maximum safety, it is self-leveling. Also, it never drops due to electric or hydraulic failure. Leveling device is positive. Heavy side guards keep out toes.—Loomis Machine Co., Clare, Mich. (53A)

DOCK-LEVELING DEVICE is raised or lowered by pushbutton. It is hydraulic unit featuring manual floating system to provide smooth, level ramp that automatically compensates for deflection of truck. Capacity: 20,000 lb. Maker: Rowe Methods, Inc., Cleveland. (53B)

DOCK PLATES for truck loading are of light magnesium alloy. **Features:** Positive position stops to lock board between dock and carrier, special curbs provide safety-first cross-over from dock-to-carrier, beveled plate edges minimize load jar.—Magline, Inc., Pinconning, Mich. (53C)

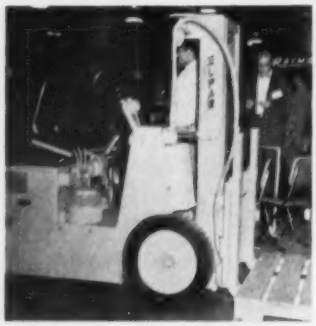
2 New Dumpers

SCALE MODELS SHOW how big detachable dump-type container is used in combination with large capacity, packer-type semi-trailer for very economical hauling of huge quantities of refuse. Here, miniatures demonstrate dumping of container of trash into trailer for toting from plant to dump.—Dempster Brothers, Knoxville, Tenn. (53D)

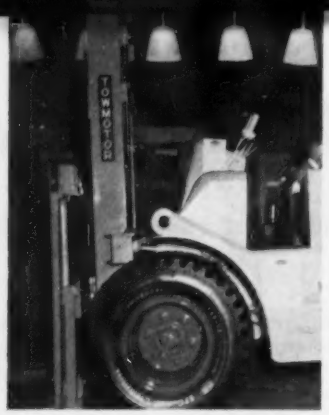
IN SIMPLIFIED handling system, metal box of product is loaded onto work-level stand by standard fork lift. Then product is gravity-fed from box into work-level hopper, where it is picked up by operator, process-treated, and finally fed to chute discharging into receiving box below stand.—Powell Pressed Steel Co., Hubbard, Ohio. (53E)

20 Advance-Model Lift Trucks

"LOW PROFILE" electric-drive fork truck is built so driver's head doesn't come above height of mast. Very short trucks range in load capacities from 2,000 to 6,000 lb. Accommodate greatest capacity standard-size battery without changing seat height of 24 in. and keeping standard layout.—Automatic Transportation Co., Chicago. (54A)



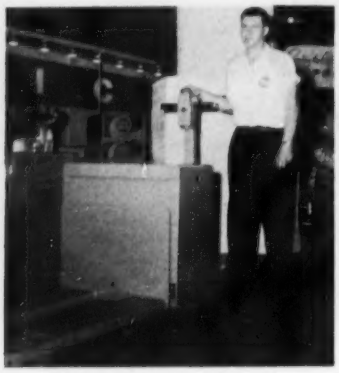
SPECIALLY DESIGNED electric-powered truck is for use where low headroom is a problem. Feature is reduced height of battery compartment, thus driver sits 18 in. lower than on conventional models. Yet visibility or operating efficiency aren't altered. Operating controls are arranged for driver comfort.—Elwell-Parker Electric Co., Cleveland. (54B)



NEW MODEL in Pace-Maker series of fork-lift trucks offers choice of torque drive or standard transmission, has adjustable off-center seating and centrallized control, while power steering is optional. Efficient, safe, and comfortable, truck drives like a car. Hydraulic action makes for faster, smoother lifting. Carriage is built to handle heavy loads.—Towmotor Corp., Cleveland. (54C)

RIDER-TYPE, gasoline-powered lift truck has all-hydraulic drive and control. Wheelbase may be extended for speedier travel, shortened for maneuverability. Simplified lift cylinder gives an extra 11 in. of free raising. Unit reverses instantly without special shift.—Colson Corp., Elyria, Ohio. (54D)

MULTI-PURPOSE UNIT operates as pallet or platform truck, elevator, or shop crane. Hand-operated hydraulic lift handles 500 lb. at 12-in. load center. Moves easily in crowded aisles, into over-the-road carriers, or onto elevators.—Oster Mfg. Co., Cleveland. (54E)



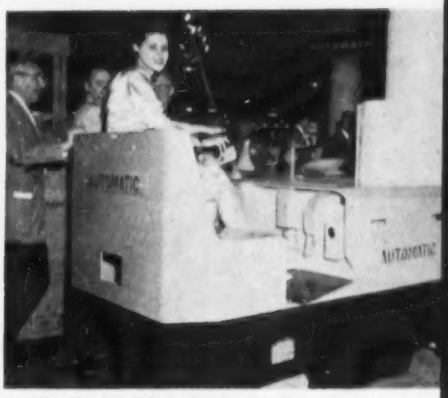
OPERATOR-LED, electric-drive pallet truck has extra-wide battery compartment (takes six-cell 19-, 21-, or 23-plate lead batteries). And 3-speed butterfly control inches truck forward or backward.—Automatic Transportation Co., Chicago. (54F)

IN THIS HYDRAULIC-DRIVE lift truck, directional control of machine is through left-foot pedal. Pressure of toe moves truck forward; pressure of heel reverses it. Clutch-less truck affords greater safety and efficiency by freeing driver's hands for steering.—Towmotor Corp., Cleveland. (54G)

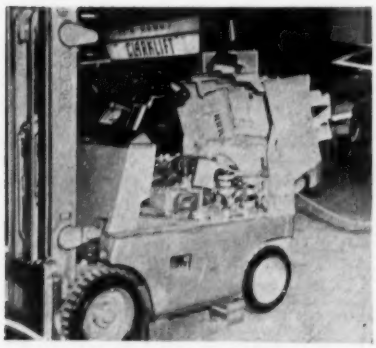
SHOCK-PROOF RIDE, smoother load carrying are attained with automatic cross-compensating system that gives this lift truck greater support and permits load to remain level. Utilizes new rear-wheel suspension to distribute load-weight evenly throughout truck—despite floor variations up to 3 in. Wheels always stay on floor, so power wheels retain full traction. Maker: Lamson Mobilift Corp., Portland, Ore. (54H)

HIGH-LIFT FORK TRUCK (1,500-lb.) pivots full 360 deg. Mast tilts 10 deg. back, 3 deg. forward, with 24-in. turning radius. Turret motor moves truck through narrow aisles and around sharp corners. And it's easily guided. — Knickerbocker Co., Truck-Man Div., Jackson, Mich. (55A)

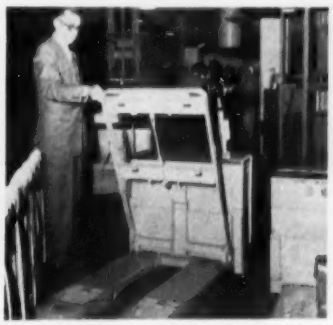
ACCESSIBILITY of engine service and maintenance points is accented in this car-drive type fork truck. Cover and side plates are hinged, and floor plates are readily removed for easy reach to linkage, transmission, and lube fittings.—Baker-Raulang Co., Cleveland. (55B)



4-WHEEL TRACTOR steers and drives like an auto. Constructed for any general tractor application, with stability provided by 4-wheel suspension. Low seat height precludes overhead clearance problems. Simple controls make it easy for any car driver to operate unit. Has hydraulic brakes. —Automatic Transportation Co., Chicago. (55C)



ELITE LINE of new fork lifts features self-adjusting brakes, solid-tire models with some diameter drive and star-wheel combination, lift-tilt controls on steering column, all-purpose deep-tapered forks, and optional radiator screens for dusty operations. Functional styling gives units distinctive streamlining.—Clark Equipment Co., Jackson, Mich. (55D)



ELECTRIC TRUCK built to handle pallets or skids (by dropping built-in platform). Unit has heavy-duty traction motor, positive electric brake, hydraulic 3-piston-type pump, and controls in handle head. Speeds: Traction, 2.1 and 2.3 mph. (6,000 and 4,000-lb. capacities). Lifting: 4 and 6 sec. (4,000 and 6,000 lb.).—Lewis-Shepard Products, Inc., Watertown, Mass. (55E)

QUIET-RUNNING, rugged electric truck has two driving wheels, handle braking, parking brake, sealed alloy gears, and sealed ball-bearing rollers in masts. Easy and speedy operation, safety, power, and economical performance are other plus-features. Power unit may be removed complete in 20 min. All controls at operator's finger tips.—Lift Trucks Inc., Cincinnati. (55F)

MORE⟶

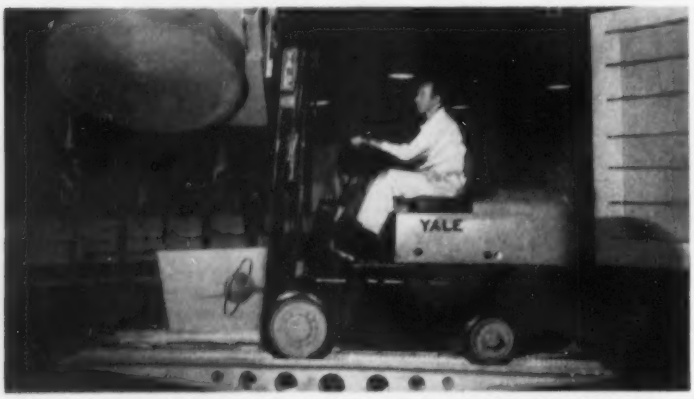
FUEL-SAVING torque converter is cited in this 8,000-lb.-capacity (at 24-in. load center) fork-lift truck. Converter is designed to provide smooth, continuous flow of power for starting or climbing on 20-30% grades under full load. Maker: Allis-Chalmers, Buda Div., Milwaukee. (55G)

NEW RIDER-WALKIE pallet truck has "breakaway" feature for easy maintenance. Removal of two pins on sides opens front away from battery compartment for easy access to hydraulic and mechanical units.—Yale & Towne Mfg. Co., Philadelphia. (55H)

TRUCK ATTACHMENT for carrying and stacking different patterned loads of various size cartons without use of pallets. Does not require carton strapping or glueing.—Automatic Transportation Co., Phila. (56A)

OVERLOAD warning signal is latest safety attachment—shown on 2,000-lb. sit-down truck. Side shifter moves capacity load off center to activate light or bell alert.—Lamson Mobilift Corp., Syracuse, N. Y. (55B)

AN ANSWER TO SPACE PROBLEM in food warehouses is this short, electric, sit-down lift truck. Without load, truck makes 6-6½ mph., and with load (4,000 lb), 5½-6 mph. Lifts 25-30 fpm. Raises empty forks 45-50 fpm. Maker: Yale & Towne Mfg. Co., Philadelphia. (55C)



PRECISE HANDLING EFFICIENCY that's possible with fully automatic torque transmission is demonstrated by balancing 6,000-lb. truck, carrying heavy paper-roll load, on a delicate see-saw. Truck's transmission contains series of hydraulic clutches. Through these clutches, inching control is achieved by foot pressure on either of two pedals. Slight depression of pedal reduces pressure, partially separating plates and reducing power to drive wheels. This inching control is in braking circuit, thus further depression of pedal applies hydraulic brakes. Exhibitor: Yale & Towne Mfg. Co., Philadelphia. (56D)

For detailed data on units circle key numbers on Readers' Service Card in front of book

3 Miscellaneous Units

THESE CASTERS are triple grease-sealed. Molded, leakproof Neoprene retainer is vulcanized on upper bearing swivel raceway. Thrust-bearing grease retainer is tightly fitted around unit's hardened raceway.—Faultless Caster Corp., Evansville, Ind. (56E)

FUEL METER measures gasoline consumption of various handling units. Abolishes tedious, costly record keeping. Positive displacement instrument has external vapor separator that insures metering of only vapor-free fuel.—Service Recorder Co., Cleveland. (56F)

FAST, ECONOMICAL, intraplant carrier whisks personnel around at 10-mph. speed. Also can pull 500-lb. trailer loads. Electrically driven, runabout costs little to run. It turns on its own length, and so operates in narrow aisles. Maker: Kalamazoo Mfg. Co., Kalamazoo, Mich (56G)

Facing the Factors As You Move Toward Automation

★ "What Must I Do Mechanically?"

★ "How Will It Affect Me Economically?"

M. H. JOFFE
President, The Emulsol Egg Products Corp., Chicago.

FIRST, how close are we to that "food plant of tomorrow"—the one in which all production operations will be pushbutton-controlled?

Second, how will this development affect our food-company economy?

Initially, let us look at recent technological progress. Here, the key is instrumentation, since the fully automated plant will appear only when process instruments can be tied into computers as part of a material-control and accounting system.

Mechanics . . .

To be truly automated, a process must cover the following seven-step controlled sequence:

(1) Materials in, (2) process, (3) product out, (4) sensing instrument, (5) computer, (6) actuator, and (7) the recycling to (1) "Materials in," with corrections made.

In step 4, measurement is made of product leaving the process. If it has deviated from standard, the computer (5) determines corrective action to be taken. The power actuator (6) then changes the input so that output is restored to normal in minimum time.

The feedback principle involves use of electronic equipment that automatically modifies its own action in accordance with information received through a sensing device. Such units now provide the wide range of sensory functions that are commonly found in automated plants.

Automation, then, removes certain manual control tasks and accomplishes them through mechanical and electrical devices. Machines or groups of interdependent machines are combined for progressive production. They operate according to an adjustable, pre-selected pattern, but are capable of changing it in response to information received by their own "senses."

A recent instance of this control process is found in the several approaches to automatic manufacture of mayonnaise and salad dressings in the article, "How Automation Techniques Can Robotize Mayonnaise, Dressings," FE May p. 62.

The electronics industry is a prime factor in the conversion to automation. Today, electronic computers are being used in a number of business offices. Usually, an operator transfers information to a form required by computers—a punch-card system or magnetic-tape recording, for example.

But some new devices, generally referred to as "intelligence readers," are in the development stage. They are designed to scan printed information and automatically interpret it for use by electronic computers. Such units may soon be available for office use.

In fact, data-scanning and recording systems for large control panels can handle several hundred or even a thousand instruments, with individual readings pattern-printed on a roll of paper. They are in use in oil refineries, chemical works, and power plants. At least one such

(*Turn to page 154*)

Handy References To Robotizing

For pertinent information on the "how" of automation—applicable in the several branches of the industry—see the following special FOOD ENGINEERING Articles. They are listed here in "latest first" order —The Editors

1956 FE: New-Principle HTST Unit Plays Top Role on Gerber Line (June p. 68), Electronic Color Sorters Raise Both Speed and Accuracy (Apr. p. 46), Robotized Filter Boosts Quality Control (Apr. p. 54), Robot Blending of Bake Mixes Ups Efficiency (Apr. p. 70), Quaker Oats Automates Pneumatic Handling System (Mar. p. 53), These Process Controls Automate Flour-Milling (Jan. p. 66), Automatic Keg Palletizer Breaks Old Manual Bottleneck (Jan. p. 80).

1955 FE: How Timed-Program Control Can Invigorate Your Retorting (Sept. p. 86), Their Roboted Filling Line Downs the Work, Ups the Output (Sept. p. 70), RR-Type Traffic System Speeds Case-Goods Handling (Aug. p. 89), Advanced Machines Do It Again (Mar. p. 68), Instrument System Robot-Checks Process (Jan. p. 64).

1954 FE: Automatic Materials Handling Brings Surer, Speedier Deliveries (Dec. p. 92), 1,000 Dozen Rolls an Hour (Nov. p. 129), Should Your Plant Palletize Automatically? (Nov. p. 75), New Controls Presage Automatic Dairy Processes (Oct. p. 78), Automatic Signals and Controls Robotize Soft-Drink Process (Sept. p. 48), Memory Unit Controls Operations in Automatic Food Plant (Sept. p. 44).

1953 FE: Food Automation Nears (Dec. p. 73), Omar Bakery Gains by Massing Ingredients (Dec. p. 60), Automation for Tomorrow's Process (Oct. p. 102), Complex Process Yields to Robots (June p. 54), Pushbutton System Cuts Handling (May p. 80).

Assures lube when working: . . . frozens . . . candies

AUTOMATIC WRAPPERS at Seabrook Farms handle 125-175 packages per minute, operate 22 hr. per day without time out for manual lubrication. The 75-100 bearings on each machine get right amount of oil regularly.

AT Sweets Co. of America auto-lube protects 'pop wrapper's bearings from abrasive sugar dust.

How Automatic Lubrication Cuts Packaging Costs

Processors in all food branches are reaping multiple benefits from modern systems installed on their high-speed machines. Cited are prime reasons for this trend to centralized lubrication, along with seven actual instances revealing its major advantages

W. O. WRIGHT

Application Engineering Supervisor, Bijur Lubricating Corp., Rochelle Park, N. J.

KEY TREND in packaging today is the increasing use of automatic lubricating equipment on all types of high-speed machinery. For it—

- **Saves thousands of maintenance man-hours a year.**
- **Cuts down, or eliminates, parts-replacement costs and product spoilage.**
- **Keeps machinery running smoothly in large-scale operations, where continous 24-hr. production is essential.**

In every case it is the only way a really adequate lubrication job can be performed.

A survey of packaging machinery reveals that certain general lubrication problems are common to a great many different types of units. These problems may vary in particulars, depending on size and complexity of the machines and nature of products being packaged. But the following six seem prevalent and pertinent to the field in general.

1. Complex machines mean more surfaces to lubricate. Today's major swing toward automation and higher production rates accounts for the rising complexity of industrial machinery. And as machine design becomes more intricate, problems of adequate lubrication become much more acute.

Many packaging machines now have over 200 bearings. Experience has proved that it is impossible for any maintenance team to accomplish adequate manual lubrication on such equipment with any degree of accuracy or necessary frequency.

2. Bearings are hard to get at. Many lubrication points on a large packaging machine are inaccessible to manual lubrication. Often, working parts are enclosed for safety and appearance. To reach them, the maintenance man may have to crawl over, under, or around other parts of the machine, or he must partially dismantle it.

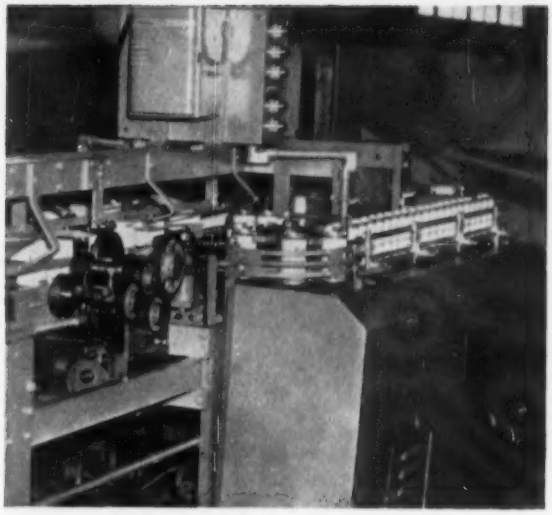
Add to these problems the difficulty of finding many oil cups or grease nipples on a large machine, also the factor of the limited time a maintenance man has to devote to any one machine, and you have a clear picture of the inadequacy of manual lubrication methods.

3. Too much or too little oil. How much oil does a bearing need? This actually involves two questions:

. . . tea

TEA-BAGGER-TAGGER-STACKER has dust-abrasion problem, too. But it's overcome by auto-lube of its 210 bearings, cams, and cam rollers.

. . . beer



BREAKDOWNS of high-speed can-cartoning machines are minimized when cyclic system was installed. Each bearing gets shot of oil every 18 min.

How much is needed for the bearing to function properly, and how often it should receive this quantity. Both questions depend on: (1) Size and type of the bearing, (2) amount of stress and load to which it is subjected, (3) bearing speed, and (4) environment in which it operates. All large machines today have a great variety of bearing conditions, which establish their own lubrication requirements.

So, assuming that every bearing on a machine is oiled daily, the oil can or grease gun gives no assurance that each gets the amount of oil it needs. A large high-speed drive shaft may require a shot of oil every few minutes for maximum protection. A small bearing may need only one drop every hour or so. In neither case, will a daily squirt from an oil can or a charge from a grease gun give correct lubrication?

On the other hand, a bearing may be over-lubricated and drip oil. If this falls on an edible product, the product is spoiled. If it falls on a package, the wrapper may be stained and cannot be marketed as a first-class item.

4. High maintenance costs. How much time should be set aside for maintenance? The usual answer is: As little as possible to keep machines running efficiently.

But the packaging field has a bigger problem—that is, how much time is actually available for maintenance? This is particularly pertinent to frozen food processors. At the peak of a season, machinery may be working around the clock, seven days a week, to keep up with the tremendous flow of fresh produce. During the brief break between shifts, the machines or the processing area must be washed down, and any necessary maintenance performed. There is little time left for even hit-or-miss hand oiling.

The same applies for meat, dairy, candy, and other food processors, where washdown is a sanitary requirement and time is at a minimum. Washdown demands immediate relubrication to protect the machine against rust and to replace any lubricant that may have washed away.

5. Personnel and safety problems. The best type of personnel for operation of packaging machinery may not be too mechanically-minded. Women, selected for their dexterity and attention to detail, cannot be expected to understand maintenance of their machines. So here you cannot look for even crude, old-fashioned oil can lubrication of a few critical bearings during operation of the machines.

As a result, the sound or feel of an overheated or rough-running bearing will generally be ignored until one of the maintenance crew happens to notice it—or more usually, it will "freeze up" completely.

Safety measures in effect at most modern packaging plants prohibit oiling of machinery while in operation. And such policies do materially reduce employee injuries. But they also necessitate complete shut-down and lost production time for hand lubrication.

6. Special handling problems. Many products contain abrasive or corrosive substances that present special problems to the machines packaging them. Tea dust, sugar, and corn starch are all highly abrasive. Machinery handling these materials is subject to special maintenance problems and requires special lubrication to keep it in top condition. Also, food-packaging machines must be safeguarded against the danger of fruit or vegetable acids spilling into their bearings and causing corrosion.

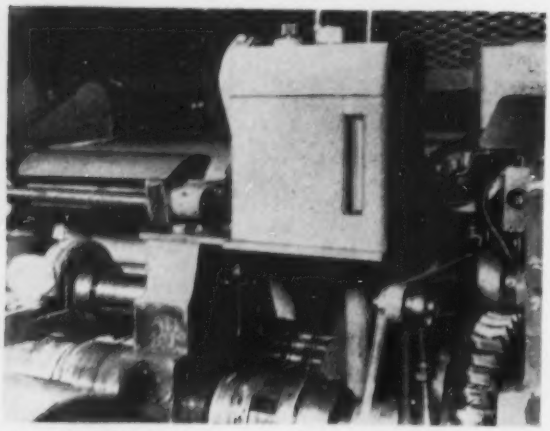
Bottled products also pose special problems, since bearings of filling and labeling machinery may be drenched with contents of a bottle that breaks as it moves through the line. Many of these products—alcoholic and non-alcoholic beverages, vinegars, etc.—can flush needed lubricant from machine bearing surfaces. Yet continuous high speed production does not permit time out for shut-down and relubrication by hand every time a bottle breaks.

Solution—Automatic Lubrication

Each of these problems has been solved on numerous types of packaging machinery by automatic lubrication systems. Our own Bijur systems are individual in design, depending on the machine and the nature of the lubricating problem. But the general pattern of each is the same—developed over 35 yr. of experience in lubrication engineering and installation.

Heart of the system is a lubricator pump, mounted integrally in its own reservoir. In most cases the pump

Closeup of Working Units



COMBINATION pump-reservoir (center) is heart of system. Its periodic filling is only maintenance needed.

TUBING, junctions, and flexible hose carry oil from main line to lubricating points.

is powered by a convenient drive mounted on the machine.

Oil is pumped from the reservoir to the lubrication points through a single line, with branch lines and junctions conveying oil to each bearing. Lines are ⅛ or ¼ brass or copper tubing. Flexible hoses are used to supply moving elements.

At each bearing a metering device filters and measures the oil according to the specific need. Standard units are available in seven different flow-rates, with several other sizes for special applications.

The metering unit is also fitted with a check valve to insure a one-way flow and prevent drain-back, thus keeping the distribution system full at all times.

Lubricator pump, discharge cycle and volume settings, and flow rate of each metering unit are determined in advance of installation. It is then installed to conform compactly to the machine's design. Occasionally, "mass" lubrication has been attempted—feeding oil from one central pump to 5, 10, or even 50 machine distributing systems. However, from practical, economic, and engineering standpoints the "unit" lubrication method is far superior.

Examples Prove System Pays Off

Here are a number of case histories that demonstrate advantages of automatic lubrication:

Seabrook Farms, Bridgeton, N. J., has a battery of 33 high-speed automatic wrapping machines for packaging its 100,000,000 lb./yr. of frozen foods. During peak season, when produce moves through the plant at rates upward of 1,000,000 lb. a day, the machines are working 22 hr. each, wrapping 125-175 packages a minute. Sanitary regulations require washdown of the entire processing area in the few minutes available between shifts.

Centralized lubricating is doing a job that Seabrook couldn't do any other way because of these time limitations. Our cyclic-type systems provide continuous lubrication for 75-100 bearings on each machine, and supply each point with the exact amount of oil it requires.

Lubrication time has been cut to a weekly checking and filling of the lubricators' 1-pt. reservoirs. And the company is saving approximately 15 man-hours a week (over 750 hr./yr.) on lubrication maintenance.

Further, our lubricators protect 46 bearing points on high-speed bacon-wrapping machines manufactured by Globe Co., Chicago. The units wrap up to 80 packages (½- or 1-lb.) a minute. If these machines were lubricated by hand, the company felt that many of the key points might receive too much oil, risking a drip onto the product and packaging material.

The system also helps prevent machinery breakdown and repairs that might cost thousands of dollars in products that spoiled while waiting to be packaged.

Also, more than 200 bearings on an automatic teabagger made by Pneumatic Scale Corp., Ltd., Quincy, Mass., are serviced by another of our automatic cyclic lubricators. The combination bagger-tagger-stacker is rated at 160-180 bags a minute.

Some of the more important points on this machine are on the hopper that feeds tea into the bagging mechanism. If these points are over-lubricated, oil drops can get into the tea.

The bagger section, with its filling, heat-sealing, and cut-off mechanisms, includes many small high-speed elements that are quickly scored and damaged unless protected by a constant oil film. And completely smooth operation at high production rates is absolutely essential in the tagger and stacker sections. Here again, tea-dust abrasion can cause misadjustment of these carefully interlocked operations.

All three sections are powered by a series of cam mechanisms extending throughout the base of the machine. Uneven wear from abrasion and drying up of cams and cam rollers could seriously affect both adjustment and operation of the entire machine. But our system provides accurate lubrication to 210 individual bearing points, thus eliminating all these problems.

Again, maintenance requires only a periodic filling of the reservoir. If the oil in the lubricator falls below a critical level, a special float switch sounds an alarm, notifying the machine operator that the reservoir must be filled.

Machines made by International Filling Machine Corp., Petersburg, Va., can fill 400 cans or bottles per min. On these units, our automatic lubrication is standard equipment for three reasons: (1) It insures continuous lubrication of inaccessible bearings; (2) the equipment is frequently operated and maintained by personnel unfamiliar

with its complexity and lubricating problems, and (3) automatic lubrication provides continuous built-in protection for high-speed precision parts on this machine.

Modern design and automatic features of the machine, combined with automatic lubrication, successfully prevent undue strain on operating members even at the high speeds attained, keep the machine in adjustment at all times, and minimize transfer and handling problems, particularly during bottle-filling.

At Sweets Co. of America, Inc., Hoboken, N. J., one of the key maintenance problems is combating a high sugar-abrasion factor on automatic lollipop-forming and wrapping machines. Each machine handles about 420-450 chocolate-centered suckers a minute. Unless such machinery is properly lubricated, moving parts will freeze, and time and money will be wasted replacing them.

On the 'pop-former, our system provides continuous controlled lubrication for five cam bearings at the top of the machine. Because the product is edible, a special edible oil is used for a lubricant.

In the automatic wrapping, sugar abrasion again is a problem. With 37 bearings on the machine serviced by the automatic lubricator, the wrapper has practically 100% protection. As with the 'pop-former, lubrication maintenance on this battery of machines consists of a daily filling of each of the reservoirs.

Beer-can filling machines manufactured by Crown Cork & Seal Co., Baltimore, are protected by a specially designed unit that provides three types of lubrication to different parts of the machine. A "continuous branch" of the system lubricates a pair of gears, a cam, and 30 followers. The "cyclic branch" lubricates a series of bearings, a chain, and several gears. And the "jetting branch" sprays oil on 30 lift cylinders.

Oil flow for the entire system is via one lubricator, driven by the machine through reduction gearing. A float switch attached to the reservoir

(*Turn to page 95*)

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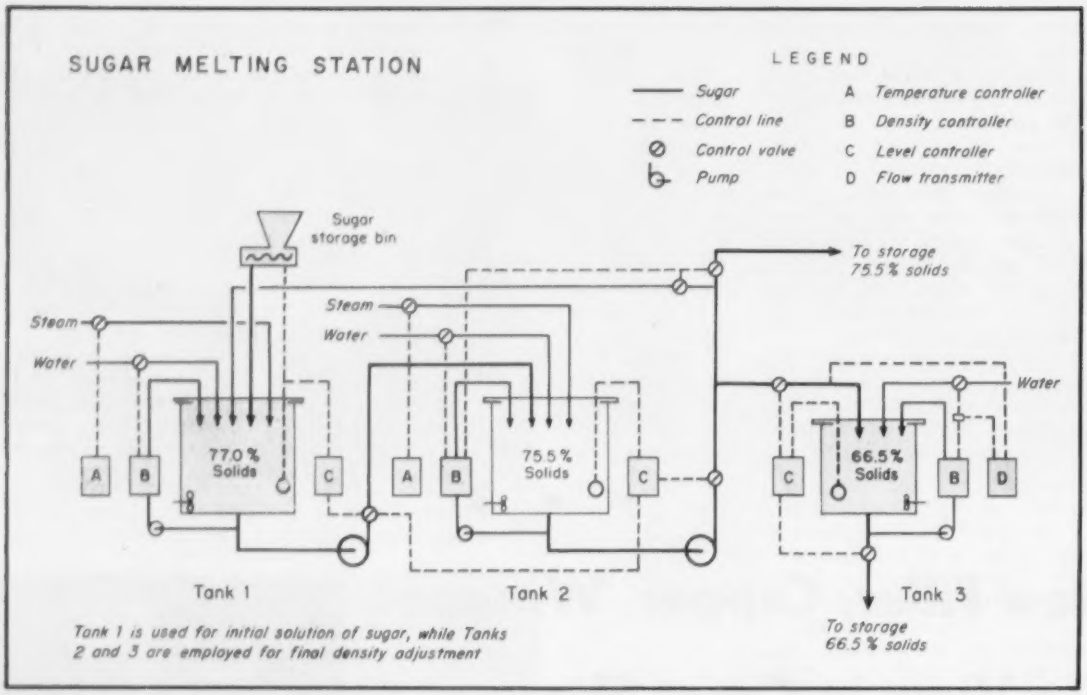
New Filler, Capper, Wrapper On View in Coast Show

FE's CAMERA centers on three of the "standouts" among machines displayed at recent Western Packaging & Materials Handling Exposition in Los Angeles. (For more details on these units, circle key numbers on Readers' Service Card, front page.)

AUTO-CONTROL LIQUID FILLER regulates package fill by exact weight to within 0.1%. It handles liquids, or highly viscous materials, at rate of 1 gal. in 6 sec. or 5 gal. in 16 sec. Desired weight is first set on Exact Scale balance. Then automatically controlled preliminary and cut-off valves assure filling to this weight.—T. R. Mantes Co., San Francisco. (61A)

CAPPER FOR PLASTIC CONTAINERS is fed by four cylindrical cap holders—filled ones rotating into position to replace empty ones. Conveyor then moves filled containers under rollers that press on friction plastic caps securely. Speed: 40-120/min.—Cap-Rite Corp., Van Nuys, Calif. (61B)

NEW WRAPPING MACHINE seals longitudinal seam on side of package, instead of top or bottom. Preset electric-eye controls cut of wrap within $\frac{1}{32}$ in. Adjustments are simply made for widths, length, and height of package, also positioning of wrapping material. Rate: 30-60 units/min.—Schooler Mfg. Co., Burbank, Calif. (61C)



This Auto-Continuous System Makes—

Precise-Density Liquid Sugar

Robotized controls curb errors, hold solids contents to exacting standards

W. D. HEATH

Technical Department, California & Hawaii Refining Corp., Crockett, Calif.

GRANULATED SUGAR is now dissolved continuously and automatically at the Crockett, Calif., refinery of California & Hawaii Sugar Refining Corp.

▶ **Human error is specifically curbed by this new system which, through precise, automatic controls, holds syrup densities constant.**

The close density control is required because the liquid sugars are sold on the bases of standard densities. Variations in solids content could result in unwarranted loss or gain to either customer or refinery.

The system produces liquid sugars on a continuous basis with a minimum of attention. Routine checks by refractometer show that the densities of only a small number of samples are outside the specification limits of ±0.2% solids.

Example: During the first three months of this year, more than 98% of all samples were within these close limits. This is satisfactory control, since these were grab samples and show densities at any given instant.

Morever, most of the reported densities that were not within the prescribed limits resulted from production difficulties related to such occurrences as a stoppage of sugar, a sudden large flow variation, or the factors of a station start-up. These are times when momentary off-densities may be expected.

Over long periods of time, the average density of liquid sugar produced was also held to close tolerances.

Example: The average density of the Type 0 (66.5% solids) liquid sugar produced in 1955 was 66.51% solids. The maximum variation in daily average density was only a few hundredths. This proves that consistently accurate measurement and control are being maintained.

Here's the Process

Production of Type 0 syrup is relatively simple, merely calling for dissolving granulated sugar in water under controlled conditions. The production of Type 50 (50% invert sugar 50% sucrose–77% total solids) and other partially inverted "tailored sweeteners" is somewhat more critical, since it requires inversion with hydrochloric acid.

At the melt station, wet granulated sugar from the refining process is dissolved in water to make two products, one 75.5% and the other 66.5% sugar by weight. These syrups can be made simultaneously or singly at rates varying from 1,500 to 6,000 gal./hr.

The heavier density syrup is used for subsequent processing into the partially inverted types of liquid sugars. The lighter product, a sucrose syrup of low color and ash content, is the finished Type 0 liquid sugar.

A variable speed scroll conveyor controls the rate of continuous sugar addition to Tank 1 (see diagram). Required amount of water is added to this tank and the material is heated by steam injection, producing a partially dissolved product having a density of 77% solids and a temperature of 80 deg. C.

This liquor is pumped to Tank 2, where solution is completed and additional water added to adjust the density of the syrup to 75.5 ± 0.2% solids. The syrup is then pumped either to Tank 3, to be made into Type 0 liquid sugar, or back to the refinery to be made into one of the "tailored sweeteners."

If, for any reason, the density in Tank 2 varies from that prescribed, recycle valves are actuated by the density controller and the off-density material is circulated back into Tank 1.

Automatic controls greatly reduce the amount of manual attention required for efficient operation of the station.

Of these, density regulators are probably of most interest because of the difficulty usually encountered in controlling this variable. Two types are employed.

Instruments Scrutinized

A Brown density controller (Minneapolis-Honeywell Regulator Co.) is used in Tank 1. This device consists of a large float enclosed in a chamber. Liquor is pumped continuously through the chamber and completely surrounds the float. The force on the float, which is proportional to density, is transmitted pneumatically to a receiver-controller, which positions the water valve to give the desired density.

In Tanks 2 and 3, "Densitrol" density measuring devices (Precision Thermometer & Instrument Co.) are employed. These use a totally submerged glass hydrometer enclosed in a flow chamber. The hydrometer is restrained by calibrated chains.

Position of the hydrometer indicates density, with electrical detection by a potentiometer receiver-controller. The controller, in turn, positions the water-control valve pneumatically.

Since density measurements are very sensitive to temperature, both Densitrol instruments are equipped with automatic compensators that correct for slight variations in temperature. Major variations are avoided by automatically controlling the temperature of the material in the tanks.

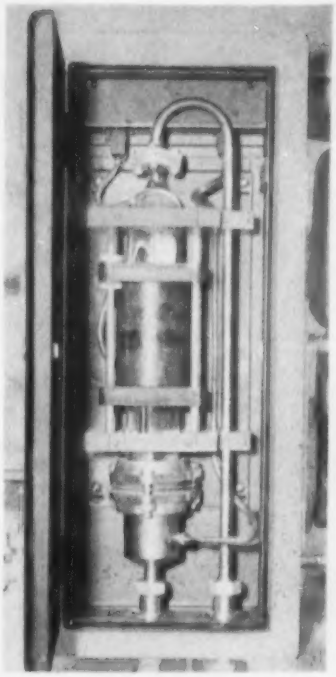
Liquor is circulated through the density measuring devices by small sample pumps. Because of the high viscosity of sugar liquor, the Densitrol units operate on an intermittent cycle, with the flow bypassing the chamber during the measuring part of the cycle.

The instrument on the 75.5%-solids material operates on a 40 sec. cycle (20 sec. purge, 10 sec. settle, 10 sec. measure), and the instrument on the 66.5%-solids material works on a similar cycle of 20 sec. duration. The flow is continuous through the Brown unit. Intermittent nature of the measurement with Densitrol instruments introduces an appreciable time lag in the measuring circuit. While undesirable, this causes little difficulty as long as the dilution tanks are large enough and flow rates are reasonably constant.

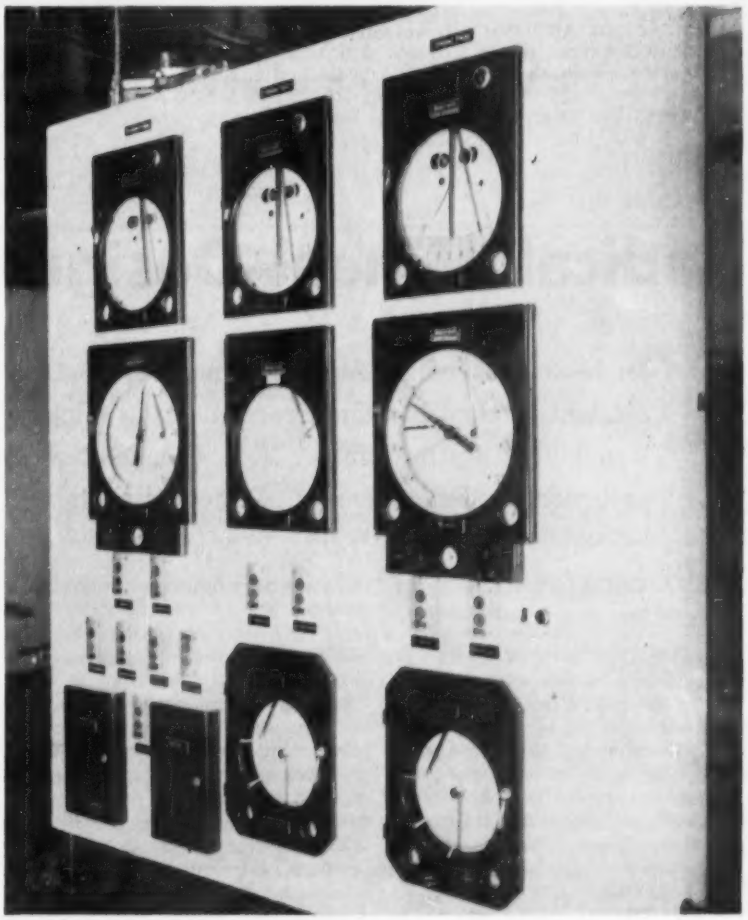
Diluting Problem Solved

Initially, difficulties were encountered in diluting to 66.5% solids in

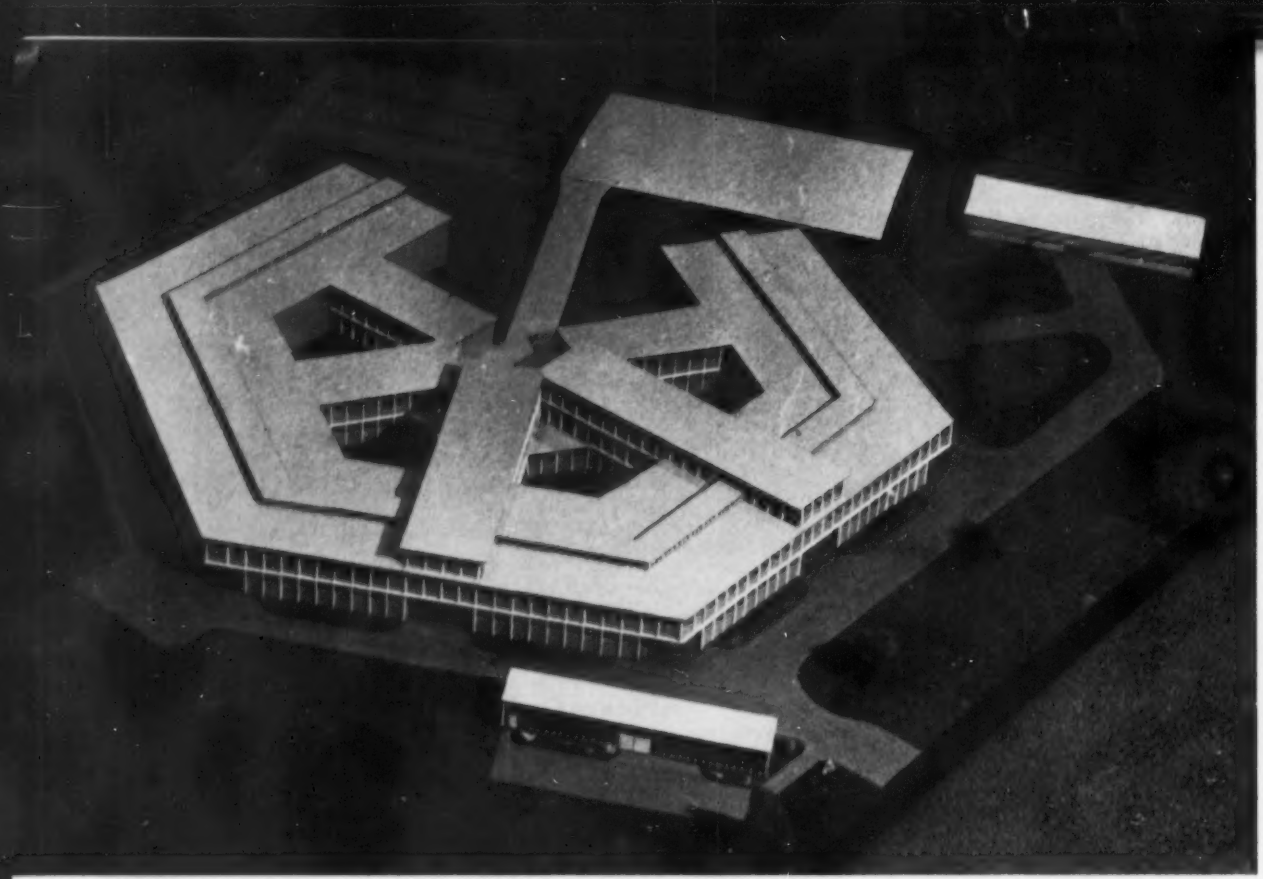
(Turn to page 208)



DENSITROL INSTRUMENT through which syrup is circulated by small sample pumps. Unit incorporates an automatic temperature compensator.



CONTROL PANEL is compact. Level controllers are seen in top row, those for density in middle row, and those for temperature on the bottom.



"HUB, SPOKES, AND RIM" are revealed by scale-model closeup. From yard (rear) livestock will be driven up roofed ramp to hub, then distributed into spoke-wings for killing, dressing, and inspection. Refrigeration rooms will form upper rim. Small-item processing, bacon operations, and canning will be carried out on ground floor, also by-product activities (fed from area below hub). Separate administration building is in foreground. To right of roofed portion of stockyard is equipment stores building. Full faces of building measure 260 ft.; end-section faces 220 ft.

Radical 'Wheel-Design' Meat Plant

To be constructed in Australia, modern "prefabbed" facility will afford straight-through handling from killing to shipping . . . "Spoke" operations seen giving top flexibility . . . Economies forecast through unitizing all processing under single roof . . . Modern equipment and handling specified

ALICJA GROBTUCH
McGraw-Hill World News, Melbourne, Australia

A UNIQUE "polygon wheel" design is to be the outstanding feature of Australia's new multi-million dollar abattoir and meat-processing plant, to be erected at Laverton, near Melbourne.

Ground was recently broken for the ultra-modern facility, which is to be an attractively landscaped "showplace" plant. Operator will be A. Weinberg Pty. Ltd.

Called the first of its kind, the design has been developed by the architectural firm of Thomas Percy, Morrish & Assoc., of Carlton, Victoria, which is now seeking patents on the basic layout.

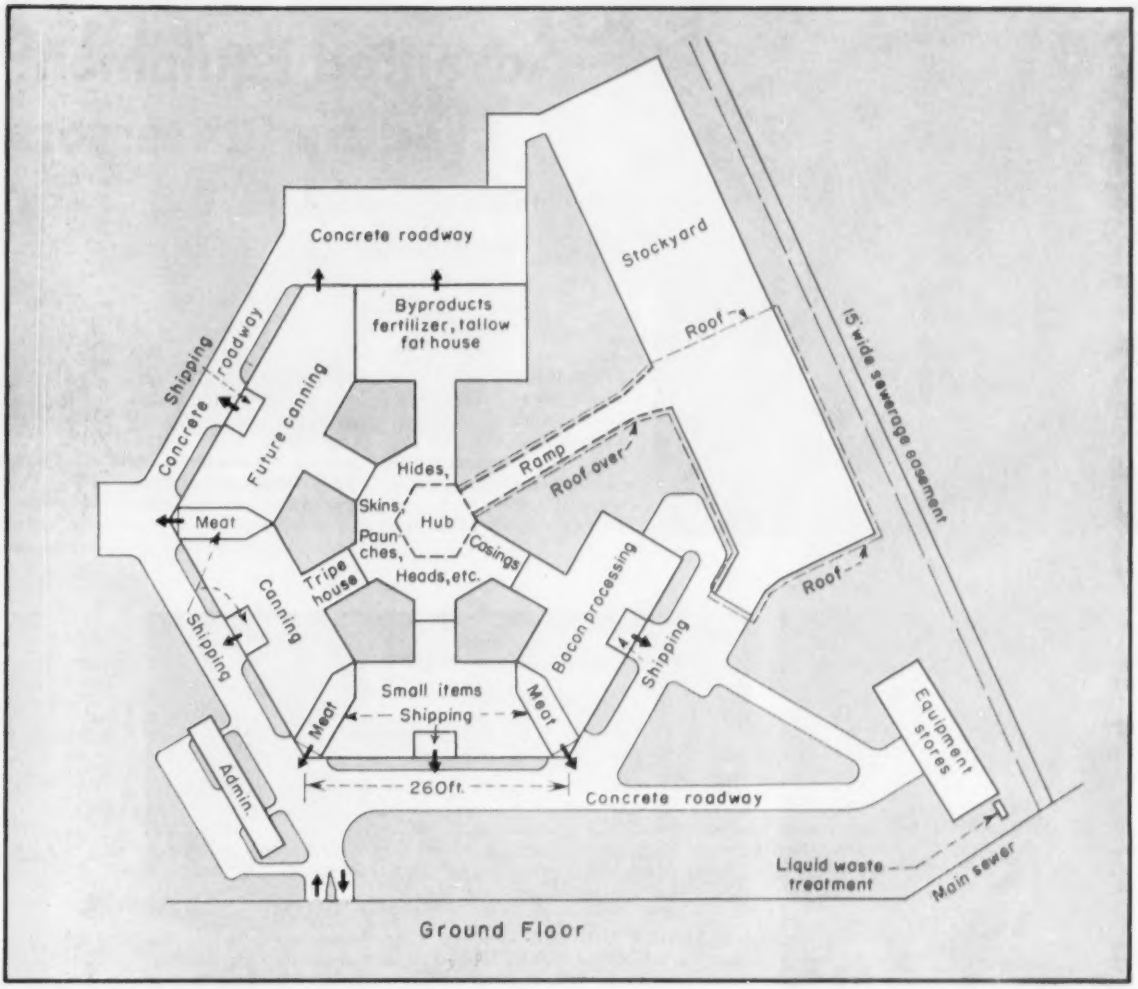
Modern techniques of handling will be employed—power trucks, conveyors, chutes, pumps. Meat will move on powered chains and rails. Carcasses can remain on one rail or chain throughout. In short, there will be no shunting from moment of kill to eventual shipment of product after chilling.

According to preliminary ranging of production, 75,000 sheep, 7,000 calves, and 5,000 steers would be put through each 5-day week, working on a single-shift (8 hr.) basis. Potential capacity, however, would be considerably greater with additional shifts.

Also, more floors could be added, given the demand. Moreover, the rim of the structure could be expanded.

Yard to Hub to Spokes

In the slaughtering routine, stock will be driven from the adjacent yards up a 10%-grade ramp to a central



GROUND-FLOOR PLAN shows sectionalized processing and byproducts operations. Note area under **hub serving** as collection point for materials for byproducts. Shipping docks are at each corner and midway in each section side.

arena formed by the hexagonal hub of the structure (see illustrations). From this area, the stock will feed into specific "spokes" of the wheel extending from the hub at the second-floor level.

These spoke-wings will accommodate the killing and dressing floors, allocated according to type of stock. The several spokes will give ample flexibility of operation, and there can be multiple-stock handling in any one.

Chilled In the Rim

Animals will be slaughtered immediately upon entering the wing. This will enable blood and offal to be passed directly to the ground-floor area for movement, via an inner circuit, to the byproduct plant, integrated in the building.

Carcasses will then move to the central section of each spoke for dressing and inspection.

Refrigeration rooms will form the rim of the wheel at the second-floor level, while processing areas will be on the periphery on the ground floor. Easy expansion of these facilities will be possible by widening of the rim, as aforementioned.

Nature of the layout allows each carcass two exit routes by way of the refrigeration sections on either side of the dressing floor. One side will handle meats for local consumption; the other will be devoted to export business.

The designers state that the complete unitized segregation of the specific processing activities—with resultant economies—will be achieved at all stages. Carcasses that are to be boned (for canning or other manufacturing processes) can be conveyed to any portion of the plant via a transit-way forming the perimeter of the wheel at second-floor level.

All edible products will be handled throughout under one roof. Centralized and simple livestock control will be emphasized through the ramp delivery, without need of costly and inconvenient external access.

The outer periphery roadway will give maximum access to all parts of the plant. As seen in the illustrations, administration and other non-processing functions will be separately housed.

Offal Handling Services

Handling of all offal will be centralized to insure absolute cleanliness on all dressing floors. All floor drains will be of special precast type (similar to the structure's precast beams, to be described presently). These drains will pitch toward collection points adjacent to every other portal frame—i.e., a maximum 20 ft. run on any drain. Covers will be of wrought iron with ½-in. bars and 1-in. clearances.

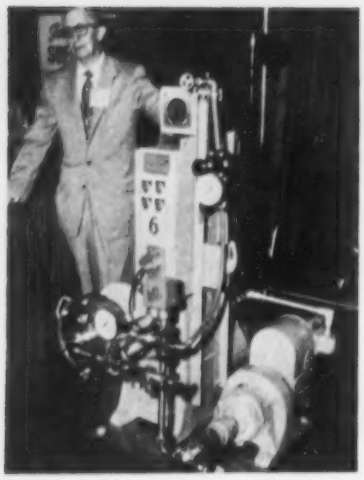
Steam will be provided by a stand-

(Turn to page 208)

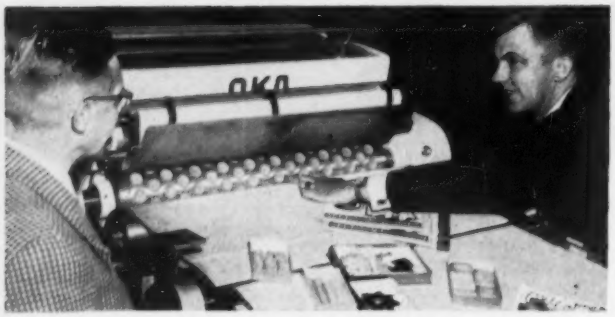
Advanced Equipment Eyed by Processors

Heat-processing, mixing, packaging, forming, coating units displayed at Confectioners' show

SINGLE-PASS HEAT EXCHANGER has special film-thickness adjusting device. This permits rapid, high-ratio concentration of heat-sensitive or foamy liquids; heating or cooling of viscous materials; steam stripping; and deodorizing. Six models are available in corrosion-resistant metals. They offer evaporative capacities from 40 to 2,800 lb. of water per hr.—The Kontro Co., Petersham, Mass. (66A)

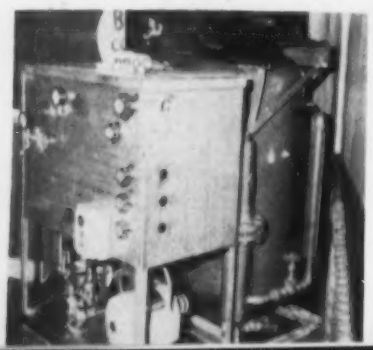


SMALLER CONTINUOUS MIXER handles cake batters, creams, and biscuit and candy marshmallow at up to 1,000 lb. per hr., depending on product.—E. T. Oakes Corp., Islip, L. I., N. Y. (66B)



VERSATILE MOLDER employs interchangeable cylinders for shaping variety of cookies, confections, and centers for coating. Feed is controlled to prevent excess on roller. Molding bed is lined with special release compound that permits formed goods to adhere to variable-speed belt, thus molds are emptied without use of pressure. Unit is of German make (Otto Kremmling, Darmstadt-Eberstadt). Displayer: T. C. Weygand Co., New York City. (66C)

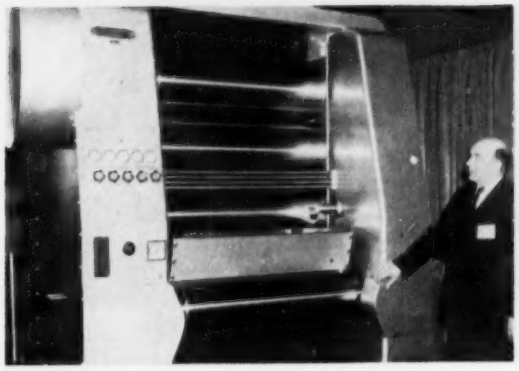
SELF-CONTAINED WHIPPER is new lower-capacity model for continuous production of marshmallow and frappes at up to 1,800 lb. per hr. Unit employs compressed air and diffusion chamber to eliminate mechanical beaters.—Paul F. Beich Co., Bloomington, Ill. (66D)



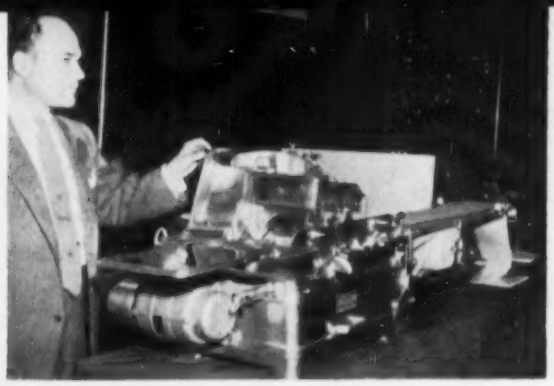
MULTI-ITEM WRAPPER operates with film, foil, and heat-sealing parchment at 800-1,200 units per hr. Package height, width, and choice of folds are automatically adjustable. Displayer: National Equipment Co., New York City. (66E)

AUTOMATIC WRAPPER for hard-candy has special feeding device and adjustable speed control. Photoelectric registration gives flexibility in wrapping solid or filled candies at 300/min.—Carle & Montanari, Inc., Hackensack, N. J. (66F)

Cacao Mill and Coater

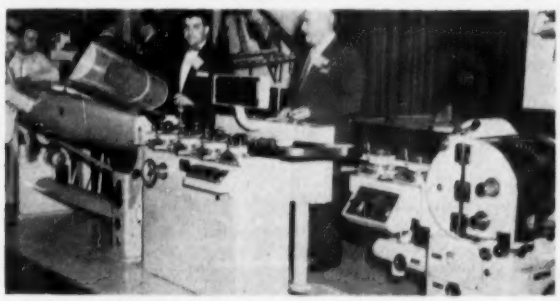


5-ROLLER MILL for cacao and chocolate pastes is fully hydraulic. It holds pressure tolerances despite temperature variations. Special water cooling allows higher roller speeds. Shift-knob disengages rolls for easy cleaning.—Buhler Bros., Inc., Fort Lee, N. J. (67A)

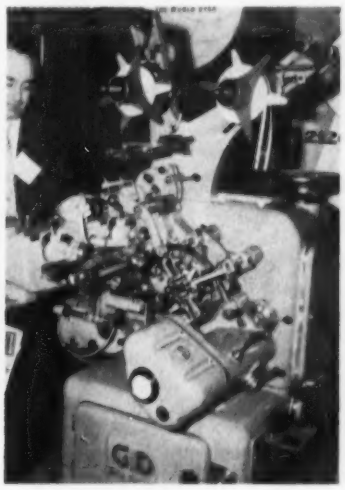


7-IN. CONTINUOUS COATER has daily output of 400 lb. of vari-shaped pieces. Conveyor speed is adjustable. Chocolate container holds about 33 lb. Unit is of Danish make (A. E. Nielsen Maskinfabrik, Holte). Displayer: C. Tennant, Sons & Co., New York City. (67B)

2 Formers

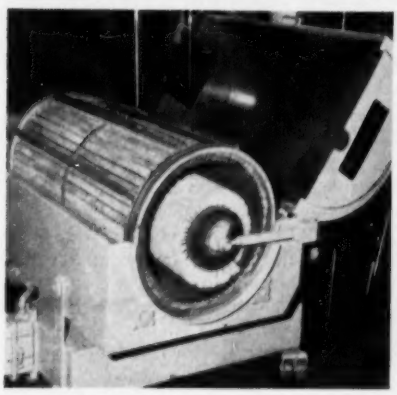


AUTOMATED PLASTIC-FORMING LINE handles up to 1,500 lb./hr. of solid or filled hard candies. Seen (left to right) are: New panel-controlled batch roller, variable-speed rope sizer, and plastic former with heated die chamber. Other components (not displayed) include rotary-action filling machine and three-tier cooling conveyor.—Carle & Montanari, Inc., Hackensack, N. J. (67C)

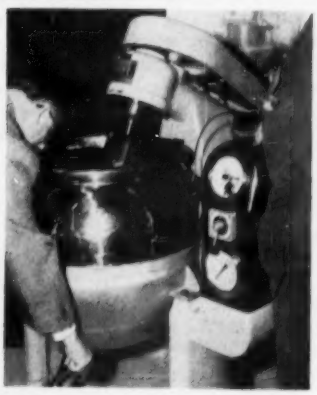


HIGH-SPEED FORMER takes caramel-type products directly from batch roller, then forms, cuts, and wraps them (fold or twist) at up to 650 per min.—Supermatic Packaging Corp., Newark, N. J. (67D)

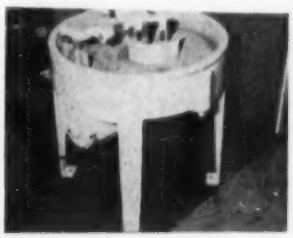
Starch Remover, Cooker, Beater



STARCH-REMOVING UNIT vacuum-brushes variety of candies, without damage to goods. Brushes are adjustable and easily removed.—Currie Mfg. Co., Chicago. (67E)



35-GAL. STAINLESS COOKER has cast-bronze agitator, steam gage, temperature control, and timer.—Carle & Montanari, Inc., Hackensack, N. J. (67F)



NEWEST CREAM BEATER has a totally enclosed motor, bevel-gear drive, and cooling jacket. Available in 2, 3, 4, and 5-ft. models. Capacities: 25-200 lb. per batch. Displayer: Dayton Specialty Machine Co., Dayton, Ohio. (67G)

For detailed data on units circle key number on Readers' Service Card in front of book

Outside beauty—which was matched with inside efficiency when . . .

They Built a Better Smokehouse

RAYMOND J. GHIZZONI
Chief Engineer, Colonial Provision Co., Inc., Boston

WE HAVE USED air conditioned smokehouses from about the time they were first invented. And during this period, we have constantly modified and tinkered with various models, seeking always to improve their basic performance and efficiency.

▶ **Now, at our new, $2,000,000 headquarters plant in Boston, we have twelve houses that we believe point up our ideas on smokehouse control.**

We designed them completely ourselves, and they were then built for us by senior members of Louis Sack & Co., Inc., Boston (formerly with Emerson-Sack-Warner Co.).

With these new facilities—plus an even later modification in our Florida plant — we have reduced product shrinkage a full 3%. Smoking times are shorter, too, which gives us a production boost. And through two unique air inlet systems, we get perfect smoke control throughout.

Here's the way we do it:

Flat "Snouts" Focus Air

To start with, we have never taken much stock in humidity control. Our argument is that, given careful production control, and an operator who knows what he's cooking and what its moisture content is, there is no need for any additional moisture in the house.

With this in mind, we have concentrated solely on getting smoke and temperature conditions as even as possible in all parts of the house to avoid hot and cold spots.

Special heating units, built into the rear of each unit, accomplish this job. Each heater contains two squirrel-cage blowers (Trane, 6,000 cfm.). In operation, the fans draw smoke and air from the bottom of the smokehouse through two louver-type dampers. Between dampers and fans, air passes through two coils (80 lb. steam pressure).

Blowers discharge air through flat "snouts" that constrict (vertically) and merge together (horizontally) at their exit. They cover the entire width of the house (see diagram). Air velocity at the outlet is 2,000 fpm.

Key device in this arrangement is a rotary damper (located at air discharge point) that is turned at 5 rpm. by a ¼ hp. gear-ratio motor.

When damper vanes are parallel with air flow, smoke is directed across top of smokehouse. As damper rotates, smoke is gradually forced down toward the floor. When damper is a full 90 deg. to flow, air is momentarily short-circuted.

And in addition to dispersing smoke evenly, the damper has a further function: as it directs smoke downward it also impedes flow, cutting velocity to 1,000 fpm. This prevents excess heating of nearest products.

Air Baffled to Dampers

A second feature that comands attention is the curved baffle at the top front of the house. This bends air around, directing it along the floor toward the heating-unit dampers.

The house, itself, is constructed of steel. Floor is tile. A drain at rear of house, running the full width, handles wash-up water.

Smoke for all twelve houses is generated by two large Mepaco machines (750 cfm), and is introduced into heaters between fans and heating coils. This prevents accumulation of tar on coils.

The only change made in the standard generators was to replace the Mepaco blowers with turbine-type fans (Sturtevant). This was necessary to overcome static pressure in the smokehouses.

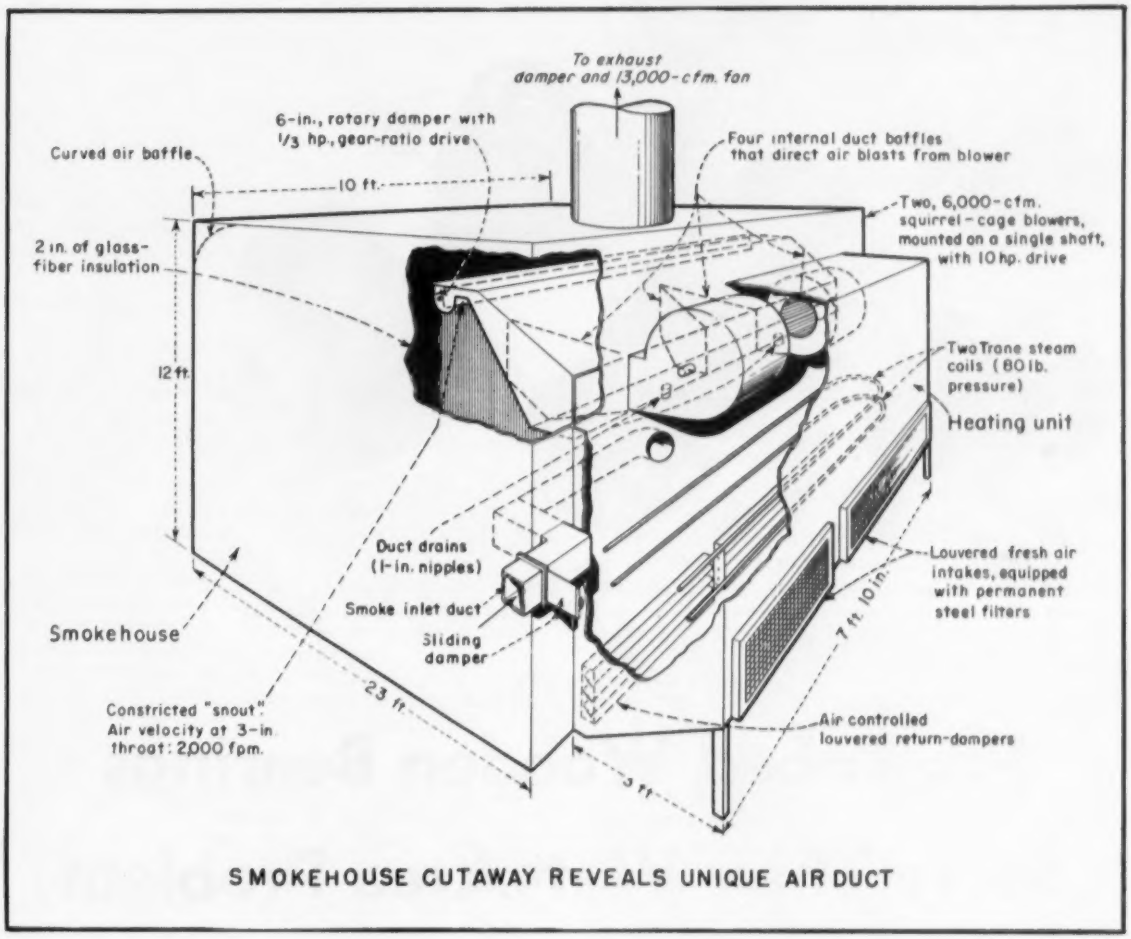
An even more recent modification of our smoking system is found in the installation at our Boca Raton, Fla., plant. Here we place the heating unit right in the smokehouse. Motors used are silicone-wound to stand the high temperatures.

Smoke is introduced directly into a water sump in the house (see second diagram), instead of into the heater. And each house is equipped with its own smoke blower, which draws from a main header that is connected to a smoke generator.

Advantages are obvious: The water sump eliminates heavy tars before smoke reaches meat. And the individual blowers give very precise control of smoke in the house. Because the static head in the main header is zero, smoke is provided only on demand. When a blower is shut off, generator merely turns out less smoke, instead of overloading all other houses on the line.

For temperature control at both plants, we use a single, one-pen recorder (Powers). Two pushbuttons are located under this regulator: One for starting and stopping heating fans and damper gear-motor, the other for a house exhaust fan.

Two manual controls regulate an exhaust damper as well as two louver-


To exhaust damper and 13,000-cfm. fan
6-in., rotary damper with 1/3 hp., gear-ratio drive
Curved air baffle
10 ft.
Four internal duct baffles that direct air blasts from blower
Two, 6,000-cfm. squirrel-cage blowers, mounted on a single shaft, with 10 hp. drive
2 in. of glass-fiber insulation
12 ft.
Two Trane steam coils (80 lb. pressure)
Heating unit
Duct drains (1-in. nipples)
Smoke inlet duct
Sliding damper
Louvered fresh air intakes, equipped with permanent steel filters
Smokehouse
Constricted "snout". Air velocity at 3-in. throat: 2,000 fpm.
23 ft.
7 ft. 10 in.
Air controlled louvered return-dampers
3 ft.

SMOKEHOUSE CUTAWAY REVEALS UNIQUE AIR DUCT

type fresh-air dampers built into the bottom of the heating unit and coupled with the smoke dampers.

To exhaust the house, we use a 4-blade, propeller-type fan, rated at 13,000 cfm. We consider this large size necessary to insure a negative static head in the house when doors are opened, and thereby eliminate the usual clouds of vapor and smoke in the plant.

Exhaust port is positioned above and behind air "snout" to do away with a potential dead-air area.

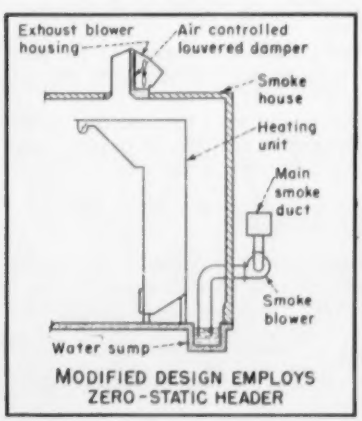
Capacities, Rates Cited

Houses hold 22 racks. In terms of product, this figures out to 1,056 shoulders (6-8 lb. each) and 528 hams (15 lb.). Separate showering and cooking cabinets (live steam) are used to prevent cooling of smokehouses.

In processing hams, meat enters house at 50F. and leaves at 140F. Smoking time is 9½ hr. Time for shoulders, 6½ hr. Yields are in direct proportion to time and pumping percentage.

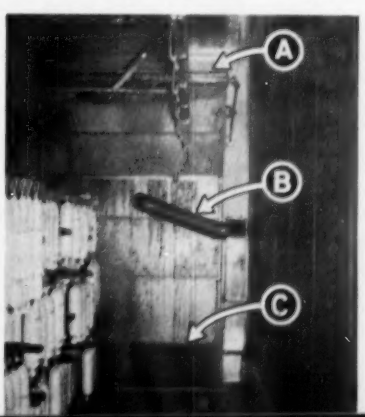
Smokehouse shrinkage is calculated at 6-6.5%—down fully 3% from any house we've used before.

Finally, we figure our shorter smoke times and cabinets have brought a production gain of three smokehouse loads in each 24-hr. period.

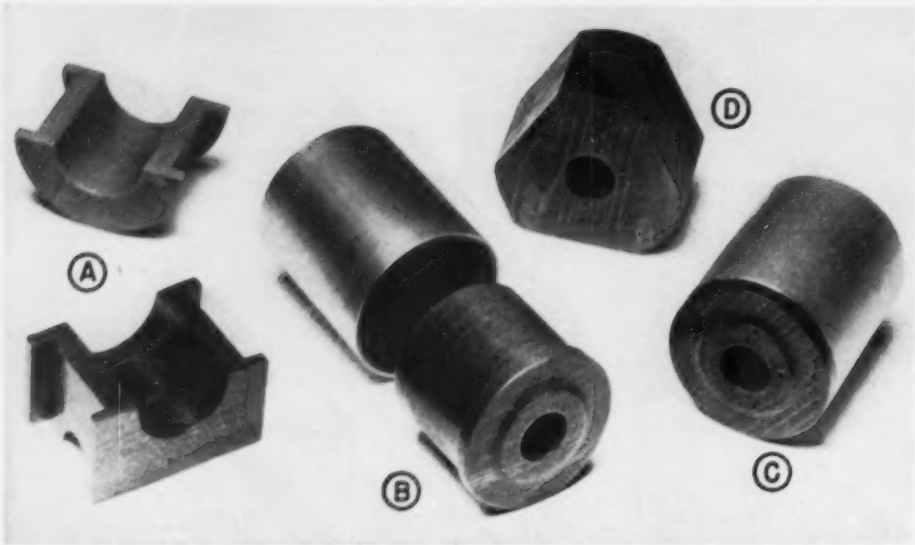


MODIFIED DESIGN EMPLOYS ZERO-STATIC HEADER

ROTARY DAMPER and its drive shaft (A) are seen in interior view. Smoke is piped into heater at (B). Return air ducts are at (C). House temperature is controlled by . . .



. . . **SINGLE-PEN RECORDERS** mounted in a central location. Switches and pushbuttons below regulators control blowers and exhaust, fresh air, and smoke-return dampers.



CLOSE FOCUS on several types of wooden bearings: (A) for screw-conveyor hanger; (B) for stainless roller conveyor, shown assembled (C); and (D) cutaway unit for under-water use.

Pre-Lubed Wooden Bearings Solve Their Wet-Area Problem

Units curb rusting, corroding, squeaking on all types of conveyors . . . Also minimize maintenance because they require no oil, will last for decades

H. E. OSTEEN
Plant Engineer, Snively Groves, Inc., Winter Haven, Fla.

MAINTENANCE can be a costly headache—especially when the product processed is both quality-sensitive and corrosive. Also, when the process requires extensive use of water, and when production is continuous, 24 hr. a day.

This was the case at Snively Groves, Inc., Winter Haven, Fla. Here, during the season (December to May), the schedule called for daily processing of some 75,000 boxes of citrus fruit into canned juices, segments, frozen concentrate, and fresh pack on a 7-day-a-week, non-stop basis.

Put Bee on Bearings

Problems of maintenance were inherent in this routine, and as the company investigated the causes of its own high costs, it became evident that bearings were playing a leading role in pushing up maintenance time and expense.

Nor was this hard to understand—for in a plant of this size and type, the number of bearings on the many units of equipment can range to the neighborhood of 50,000.

Most of these bearings will be found on conveyors, of one type or another, where ever-present water rusts them, where citrus juices and chemicals corrode them, and where, accordingly, the demands of lubrication build up a great time-consuming chore.

Snively Groves had to meet this situation squarely. And the attack it finally developed paid off handsomely with these three big savings—

1. Cutting down overall maintenance costs throughout the operating season.

2. Lowering the frequency of rebuilding of equipment during the down season.

3. Reducing the power loadings on some of the units, with a resultant decrease in plant power costs per unit output of product.

The many experiments and tests to minimize bearing maintenance led in the end to adoption of bearings made of wood for almost all conveyors in the plant.

Minimum Lubrication, Long Life

These bearings, manufactured by Arguto Oilers Bearing Co., Philadelphia, are impregnated with a special type of lubricant that never leaks. And they don't require lubrication. The life of these bearings is as long as 20 yr., and they never squeak.

Although they are operated in water or through sprays,

they do not bind, rot, or corrode—nor are they affected by citrus juices, peel oil, detergents, chlorine, or any other chemicals in food plants.

Specific Applications

Here are a few of the various conveyor applications in which these wood bearings have reduced maintenance and, in many cases, the power requirements:

In the fruit preparation house, they are used on roller conveyors, roller dryers, graders, sizers, marking machines, roller elevators, and belt conveyors.

In the juice plant, belt conveyors delivering fruit to extractors are wood-bearing equipped, and so also are the screw conveyors that remove the peel to the byproducts house.

Furthermore, these bearings have proved particularly valuable on the sectioning-plant conveyor that transports the fruit through hot water baths for loosening the peel to facilitate removal before sectioning.

Also, when cans of pasteurized juices leave the closing machine, they are cooled on conveyors that rotate them under cold-water sprays to cool the contents from 190 deg. F. down to 85 F.

In these cooling tunnels, which are 100 ft. long, 2-qt. cans roll through water sprays on a 16-in.-wide inclined belt conveyor. This conveyor is mounted on 2¼-in.-dia. rollers on 18 in. centers. And the rollers, as well as the return idlers, are equipped with the Arguto wood bearings.

The conveyors formerly used for this operation were of the slide-bed type and required 7½ hp. motors to drag them. But the wood-bearing equipped type now installed needs only a 3-hp. motor. And since the new installation, belt life on these conveyors has been tripled.

Clear Screw-Conveyor Hurdle

One of the most difficult bearing problems to overcome was in the screw conveyors, which carry away the peel discharged from the extractors.

In this operation, the screw flight is frequently submerged in the product, which is high in corrosive citric acid and peel oil content. The extent of the maintenance problem may be gaged by the fact that the conveyor troughs, though made of stainless steel, must nevertheless be replaced at the end of each season.

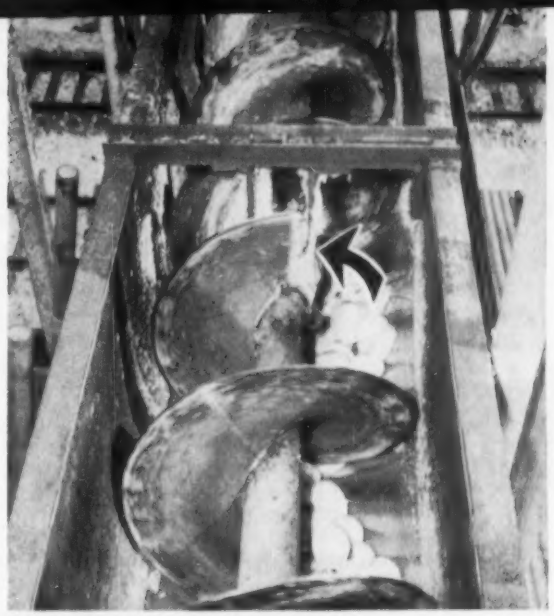
Likewise, the screw flights, some of which are fabricated from ½ in. steel, must be replaced annually.

Formerly, when any bronze or babbitt hanger bearing failed, immediate maintenance was required to prevent production-line stoppage. At best, these bearings required constant lubrication, as well as frequent replacement.

But the wood bearings were successfully fitted—thus lubrication is no longer required, and need for replacement is rare.

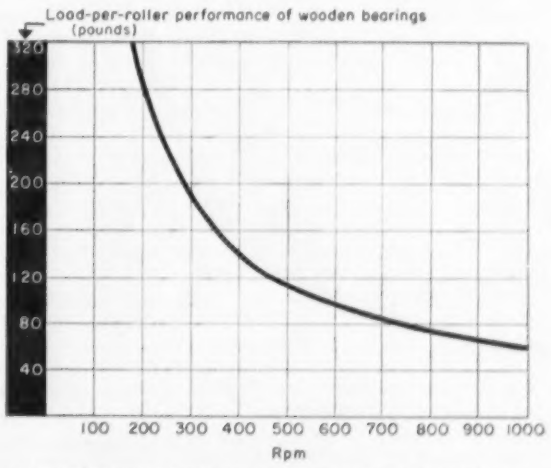
Included in the conveyor rollers employed in the plant are those made of solid wood and those of steel or aluminum tubing. Standard, self-lubricating wood bearings fit each exactly. Also, these bearings are equally accurate in fitting the hangers of screw conveyors.

Turned out on metal-working machines to an accuracy of .002 in., the wood bearings are best suited for shafts turning at relatively slow speeds and generally at moderate bearing load.



POSITION (arrow) of new bearing on screw unit. It lasts years. Old metal ones needed frequent replacement.

ON CAN COOLER, wooden conveyor-roller bearings resist spray water (arrow). And they need no lubrication.



CURVE SHOWS loads per conveyor roller at varying rpm.

This Table Speeds Your Determinations Of Vinegar Required for Proper Souring of Pickles*

Acetic Acid		Acetic Acid		Acetic Acid	
Percent Weight/Volume	(Pounds Per Gal.)	Percent Weight/Volume	(Pounds Per Gal.)	Percent Weight/Volume	(Pounds Per Gal.)
0.5	.0418	1.6	.1335	4.0	.3338
0.6	.0501	1.7	.1418	5.0	.4173
0.7	.0584	1.8	.1502	6.0	.5010
0.8	.0668	1.9	.1585	7.0	.5842
0.9	.0751	2.0	.1669	8.0	.6676
1.0	.0834	2.1	.1752	9.0	.7511
1.1	.0917	2.2	.1835	10.0	.8342
1.2	.1001	2.3	.1919	11.0	.9182
1.3	.1085	2.4	.2003	12.0	1.002
1.4	.1168	2.5	.2085	13.0	1.085
1.5	.1251	3.0	.2503	14.0	1.169

*Calculated from data in C. D. Hodgman's *Handbook of Chemistry & Physics.* 29th Ed. Chemical Rubber Pub. Co., Cleveland, 1945. Also see article text.

Simple Calculations Insure Uniform Pickle Acidity

Accurate measurements and elementary mathematics make pickle manufacture a routine job. They enable use of many different acid strength vinegars in obtaining unvarying flavor and keeping quality in successive packs

HILLIARD PIVNICK and F. W. FABIAN
University of Nebraska and Michigan State University, respectively

ESSENTIAL in most pickle formulas is vinegar. It is desirable as a flavoring agent and necessary as a preservative.

But—it must be present in the finished product in exactly the correct amount.

In standard sweet pickles with the sucrose content constant, an increase of as little as 2.8 grains of acetic acid has been found undesirable from the standpoint of flavor. Experiments have also determined, for the processor, the amounts of acetic acid and sugar necessary to prevent fermentation of sweet pickles.[1, 2]

Must Know Brine = Pickle Ratios

Most problems which involve souring of pickles to a definite acidity require a knowledge of the ratio of brine to pickles when they are just covered. This ratio is usually considered to be 28:17. A 45 gal. barrel filled with pickles will require 17 gal. to surround and just cover them.

This ratio does not hold true in all cases, however. Actually, it has been found to vary from 2.24:1.0 to 1.76:1.0, depending on the type of product.

Once this ratio has been established, the problem of souring pickles on an industrial scale becomes very simple. This is demonstrated by the following problems:

Problem A: It is desired to sour pickles in a tank to 1.3% acetic acid content.* This requires two steps:

1. Determine ratio of pickles to vinegar solution.

Volume of souring tank is found by filling with water run through a meter, then tank is drained. A cushion of about 1 ft. of water is metered into it, pickles are added to fill, and sufficient additional water is metered in to just cover the pickles. Difference between original amount of water and sum of latter amounts represents volume occupied by pickles.

For example, suppose tank has a volume of 745 gal. When filled with pickles, however, it requires only 281 gal. The pickles, therefore, occupy a volume of 745—281, or 464 gal., and so ratio of pickles to vinegar solution is 464 to 281. This ratio will be constant for this size pickles as long as they are just covered with vinegar solution.

2. Determine amount of vinegar.

Pickles are approximately 95% water. Therefore, the 464 gal. of pickles actually represent 441 gal. of water. And total volume of material capable of mixing with acetic acid (active volume) is 281+441 or 722 gal.

There are two methods of calculating quantity of vinegar required:

Method 1. If we have vinegar of

*Throughout this article, term 'acetic acid' denotes acetic acid introduced in vinegar. Use of glacial acetic acid in pickle manufacture is illegal.

10% W/V acetic acid** and wish to obtain 722 gal. of liquid with a final concentration of 1.3%, the calculation is as follows:

X gal. 10% acid = 722 gal. 1.3% acid.

$$X = \frac{722 \times 1.3}{10} = 94 \text{ gal.}$$

Balance of covering liquid will consist of 281–94, or 187 gal. water.

Acetic acid content of covering solution can be determined by using above formula–94 gal. 10% acid = 281 gal. x% acid.

$$X = \frac{94 \times 10}{281} = 3.35\%$$

If you desire to make 500 gal. of vinegar solution containing 3.35% acetic acid using 13.4% acid vinegar instead of 10%, you can employ the same formula.

$$X = \frac{500 \times 3.35}{13.4} = 125 \text{ gal.}$$

Therefore, 125 gal. of 13.4% vinegar mixed with 375 gal. of water will give 500 gal. of solution containing 3.35% acetic acid.

Method 2 depends on a knowledge of weight of acetic acid in a gallon of vinegar (see table). It is especially useful when souring is carried on in two or more stages.

Total volume of tank and active volume of pickles are determined by previously described methods.

From the table we find that 1 gal. of 1.3% vinegar contains 0.1085 lb. acetic acid. Therefore, 722 gal. will contain 78.37 lb. If we use vinegar of 10% W/V acetic acid to make the covering solution, correct volume can be found as follows:

Acetic acid present in 1 gal. of 10% vinegar = 0.8342 lb. (see table). Then the quantity required will be

$$\frac{78.37}{0.8342}$$

or 94 gal.

To obtain 281 gal. of covering solution, we mix 94 gal. of 10% vinegar with 187 gal. of water.

Problem B: Sour pickles in the jar to 0.65% acetic acid content. Here, principles employed are identical with those used in Methods 1 and 2, above, except that the average volume figure is obtained by filling at least ten jars.

As an example, a jar filled to the usual level is found to have a volume of 690 ml. When filled with pickles, it holds 240 ml. of water. Volume occupied by the pickles is then 450 ml.

Active volume of pickles is 95% of 450, or 427 ml. Total active volume is then 427 + 240, or 667 ml.

Method 1: Using vinegar of 12% acetic acid content, the formula becomes:

X ml. 12% vinegar = 667 ml. 0.65% vinegar.

$$X = \frac{667 \times 0.65}{12} = 36.14 \text{ ml.}$$

The covering vinegar can be made by mixing 36.14 ml. 12% vinegar with 203.86 ml. of water. Strength of covering solution can be determined as follows:

$$X = \frac{36.14 \times 12}{240} = 1.87\%.$$

Above calculations can also be made using fluid ounces instead of milliliters, since 1 oz. equals 29.573 ml. It must be emphasized, however, that measurements of milliliters are much more accurate than fluid ounces.

Here is an example: The jar is found to have a volume of 23.33 oz. When filled with pickles it holds 8.12 oz. water. Volume occupied by the pickles is then 23.33–8.12, or 15.21 oz. The pickles contain 14.44 oz. of active volume, and total active volume is 22.56 oz.

Using 12% acid vinegar, calculations can be made as follows:

$$X = \frac{22.56 \times 0.65}{12} = 1.222 \text{ fluid oz.}$$

Covering vinegar (8.12 oz.) can be made by mixing 1.222 oz. 12% vinegar with 6.898 oz. water. Strength of this covering solution =

$$\frac{1.222 \times 12}{8.12}$$

= 1.807% acetic acid.

Method 2. First off, 100 ml. of 0.65% acid vinegar contains 0.65g. acetic acid. Then, 677 ml. must contain 4.337g. Since all the acid will enter the jar in 240 ml. of covering vinegar, this must contain 4.337g., or 1.807g. per 100 ml. (1.807%).

To make 1,000 gal. of covering solution containing 1.807% acetic acid we again use the formula:

$$X = \frac{1{,}000 \times 1.807}{12} = 150.5 \text{ gal. 12\% vinegar.}$$

Amount of water required will be 1,000–150.5 = 849.5 gal.

Problem C: Pickles are soured in a tank and equalize at 1.1% acid. They are then packed in jars, and a sweet liquor containing vinegar, sugar, etc., is added. It is desired to have the finished product contain 1.6% W/V acetic acid. Question: What must be the acid content of the sweet liquor?

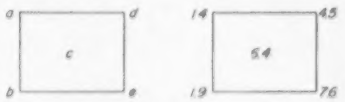
Solution: Total volume of jar and volume of pickles is determined as in the previous problem. For simplicity we will use the same figures: Volume of jar, 690 ml.; active volume of pickles, 427 ml.; volume of sweet liquor, 240 ml., and total active volume, 667 ml.

The pickles (427 ml.) soured to 1.1% contain 4.70g. acetic acid. But active volume (pickles and liquor) must contain $\frac{1.6 \times 667}{100}$ or 10.69g. acid. Therefore, 5.99g. acid are to be added in 240 ml. liquor.

This liquor will contain $\frac{100 \times 5.99}{240}$, or 2.494g. (2.494%) acid per 100 ml. Number of gallons of vinegar required to make 1,000 gal. of sweet liquor is determined by the above formula.

Remainder of liquor does not consist entirely of water, however. Sugar (going into solution) occupies 7.42 gal. for every 100 lb., and this volume is considered in any formula.

Problem D: Vinegar of low acid content can be economically recovered by filtering and combining with vinegar of high acetic content. The acetic acid concentration of both is determined by titration, and proportions of each required to obtain a solution of intermediate strength is determined using the Pearson's square:



Where:

a = % acetic acid in strong vinegar.
b = % acetic acid in weak vinegar.
c = desired % acetic acid in mixture.
d = gal. vinegar of strength a.
e = gal. vinegar of strength b. and:
e = a – c
d = c – q

For example, we require a 6.4% vinegar (c), and have a 14% vinegar (a), and 1.9% vinegar (b). We substitute these values for the letters of the left square (above) to get the square seen on the right. And we find that 4.5 gal. of 14% vinegar mixed with 7.6 gal. of 1.9% vinegar gives us 12.1 gal. of 6.4% vinegar.

To make 1,000 gal., we proceed as follows:

$$\text{Gal. of 14\% vinegar} = \frac{4.5 \times 1{,}000}{12.1} = 372 \text{ gal.}$$

$$\text{Gal. of 1.9\% vinegar} = \frac{7.6 \times 1{,}000}{12.1} = 628 \text{ gal.}$$

**Acidity in pickles is usually recorded as grains (gr.) of caid. In U.S., 1 gr. means 0.1 gram (g.) of acetic acid in 100 milliliters (ml.), or 0.1% weight/volume (W/V).

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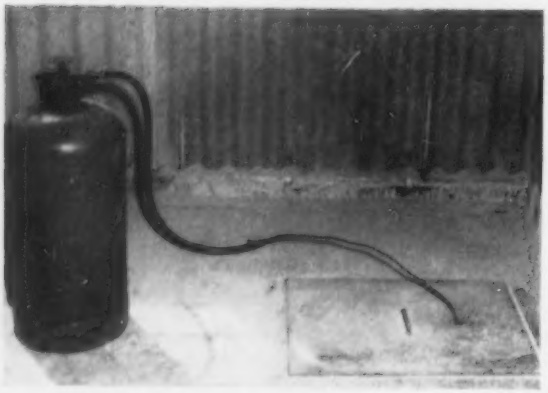
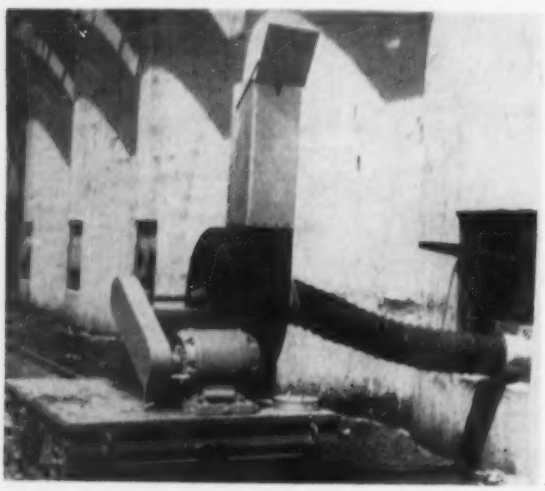
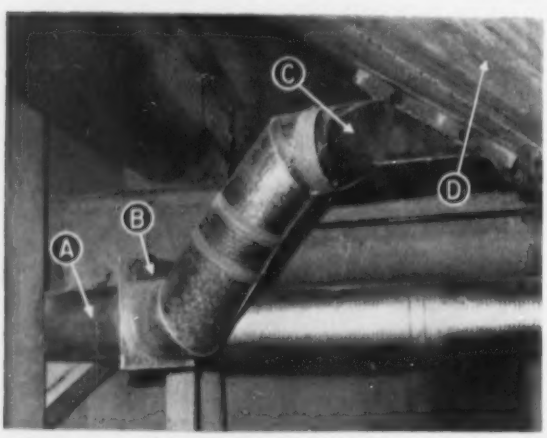


1 **IN NEWLY ADOPTED METHOD,** fumigant-gas cylinder is placed on roof and methyl bromide insecticide is piped down into silo of grain. Proportion is 2 lb. insecticide per 1,000 cu. ft. of bin space.



2 **FAN UNIT** diffuses the fumigant through silo, then exhausts it. Mounted on RR-track cart, 26-in. fan readily rolls along for hooking to trunk lines that service different groups of silos.



3 **INSIDE VIEW** shows trunk line (A) coming from port alongside spur track. Metal slide (B) diverts air flow to silo being fumigated. Air-intake box is seen at (C), and silo bottom is indicated at (D).

Forced Fumigation Gives Them Plus-Benefits

Cuts Costs More than 60%, Minimizes Labor, Curbs Grain "Hot Spots"

WILLIAM H. SCHOENHERR and RICHARD L. PARKER
Entomologists, Lauhoff Grain Co., Danville, Ill.

FORCED DISTRIBUTION of fumigants through stored grain is another forward movement in the never-ending battle against insects.

- **It takes the work out of grain fumigation, reducing it to a near-pushbutton operation.**
- **Labor costs are lowered, as well as per-bushel cost of chemical.**
- **And when conditions are right, the same air-movement system that is used in the fumigation can be of value for removing "hot spots" from the grain.**

The program to improve the technique involved experimental fumigations of grain in our storage bins at Danville, Ill., during 1954 and 1955. Included in the tests were both recirculation and forced distribution of liquid type and methyl bromide fumigants. Here, research was conducted in cooperation with USDA's Stored Products Insect Section and two companies that supply fumigants.

Our experimental recirculation system consisted of (1) a perforated intake pipe located near the bottom of the silo hopper, (2) a fan, and (3) a return duct.

The type of storage facility used in the recirculation tests was a concrete unit, 125 ft. 3 in. high and of 24-ft. inside dia., with a metal conical hopper extending 10 ft. downward from the bin bottom. Capacity was approximately 47,000 bu., with a volume of 58,170 cu. ft. of air space.

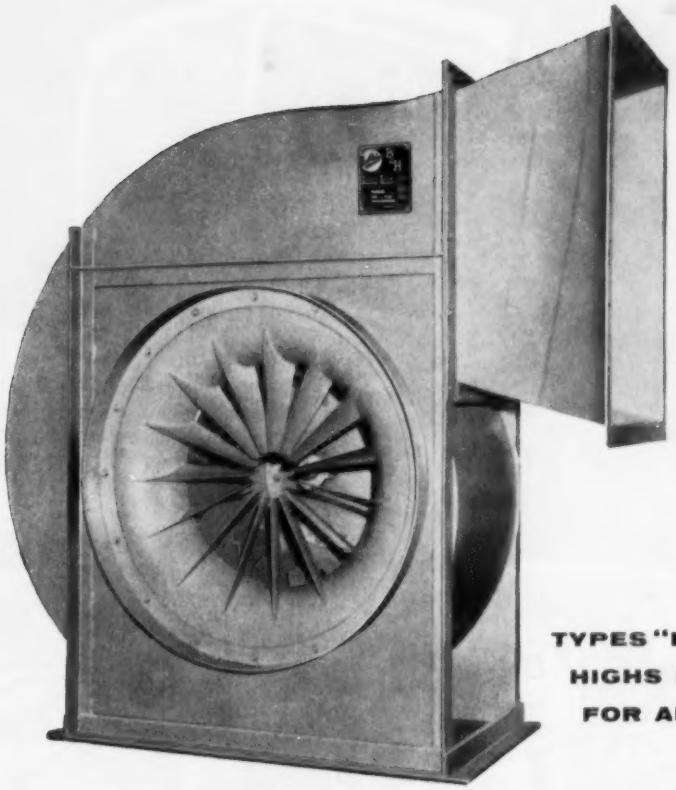
During the experiments, methyl bromide was introduced both as a liquid and vaporized. The vapor or "hot gas", was generated by heating an especially designed cylinder. Then a Gow-Mac thermal conductivity gas analysis unit was used to trace the gas movements through the grain.

The plastic air-sampling tubes were placed at every 20 ft. level, one tube in the center of the bin and two near the bin walls. Also, one tube was placed in the air space above the grain and another near the bottom of the hopper.

The fan causing air movement in the grain was turned off when the Gow-Mac readings indicated gas distribution throughout the bin. Gas readings were taken at various intervals during the 24-hr. exposure period. Additional readings were made during and following the aeration period.

Satisfactory distribution of methyl bromide in both wheat and shelled corn was attained by applying 2 lb. per 1,000 cu. ft. and recirculating for 1 hr. at air flow

(Turn to page 95)



"Buffalo"

FANMANSHIP STARTS A NEW AIR AGE OF PERFORMANCE

TYPES "BL" AND "BLH" FANS OFFER NEW HIGHS IN STABILITY AND EFFICIENCY FOR ALL CLASSES OF VENTILATION

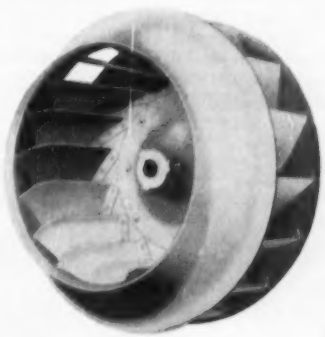
The "Buffalo" Type "BL" Fan is already widely known for its quiet, stable performance from free delivery to shutoff, as proved in many of the biggest installations. Most recent in this advanced fan series is the "BLH", with all the features of the "BL" plus the new divergent outlet, for a high, broad efficiency curve on higher pressure jobs (6¾" water gauge and up). Together, these two great fans give you a choice of the *best* fan for the job — and together, they represent the best of our 79 years of Air Leadership.

COMPLETE INLET-TO-OUTLET STREAMLINING:

INLET — a smoothly curved bell shape with cantilevered inlet guide vanes curved to give air a spin into the wheel in the direction of rotation. No obstructions, no flat or rough spots to cause turbulence and entry loss.

WHEEL — has deep-drawn flange matching inlet bell to form a semi-circular path into the wheel, again, with no rough or flat spots. Blades are the high-efficiency "Buffalo" backward curve design already proven so successful.

HOUSING AND OUTLET — smooth, generously proportioned scroll, suited to the wheel. Ample outlet. In the "BLH", the additional divergent outlet provides an easy, gradual change from air velocity at cutoff to static pressure in the duct — an important reduction in turbulence encountered at this point in high-pressure systems.



For these and other "Q" Factor features that mean better air service for your money, write today for "Buffalo" Bulletins F-102 and F-200.*

**The "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.*

"Buffalo"

BUFFALO FORGE COMPANY

BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

VENTILATING AIR CLEANING AIR TEMPERING INDUCED DRAFT EXHAUSTING FORCED DRAFT COOLING HEATING PRESSURE BLOWING

the Pfizer TV* story...

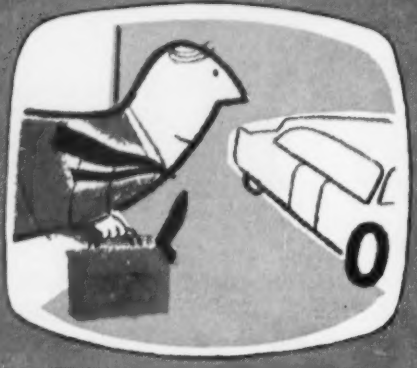
puts you in the starring role

*(This TV stands for the Tremendous Versatility of Pfizer Chemicals)

This is a story about you and the role Pfizer chemicals can play in your daily life. (Just a few examples). *Fanfare...lights...camera...*

MORNING SCENE:...You, contemplating yourself in bathroom mirror. Headachey? Cold coming on? You reach for tablets made with Pfizer Acetophenetidin (for pain relief) and Pfizer Caffeine, always of highest purity...Next...

BREAKFAST SCENE: Biscuits? Vitamin-enriched with Pfizer Bi-Cap. Jelly? Pfizer Citric Acid brings out true fruit flavor. Frozen peaches on cereal? Better color and flavor, thanks to Pfizer Ascorbic Acid. Even the...oops! We're lagging...



"OFF-TO-WORK" SCENE: You're rushing out now, into shiny car. Shiny? Sure! Pfizer acids (e.g. Citric and Tartaric) offer a wide application in metal cleaning, polishing and plating. Now we "dissolve" (as they say in TV) to...

OFFICE SCENE: You're studying blueprints...far easier to read...Pfizer Oxalates give blueprint papers special vivid blue color. We could go on with many more examples. Our point is... well, here's a brief "commercial"...

PUT MORE SELL IN YOUR LINE WITH PFIZER PRODUCTS.

Manufacturing Chemists

Pfizer

for Over 100 Years

These are some of the bulk products of the Pfizer Chemical Sales Division used in over 150 different industries:

• Citric, Tartaric, Oxalic Acids and Salts • Ascorbic Acid • Caffeine • Itaconic Acid • Vitamins • Antibiotics • Hydrocortisone • Reserpine • Plasticizers

For further information contact:

CHAS. PFIZER & CO., INC.

Chemical Sales Division

630 Flushing Ave., Brooklyn 6, N. Y.
Branch Offices: Chicago, Ill.; San Francisco, Calif.; Vernon, Calif.; Atlanta, Ga.; Dallas, Texas

Acknowledgment: "This is Your Life", NBC-TV is the property of Ralph Edwards Productions.

Data Pertinent to Proper Heat Treatment

TABLE I—LETHAL RATES Equivalent to 1 Min. at 140F., "z" = 12.5

Formula: Lethal Rate = $\dfrac{1}{\text{Log}^{-1}\dfrac{140-T}{12.5}}$

where T = Beer Temperature

Temperature (Deg. F.)	Lethal Rate
110	0.004
120	0.025
125	0.063
130	0.158
135	0.398
140	1.000
145	2.51
150	6.31
155	15.80

TABLE II—TYPICAL OPERATING SCHEDULE for Double-Deck Pasteurizer Performance Specifications—Top Deck: 32-oz. Steinies, Lower Deck: 12-oz. Cans, Capacity: Cans 400 per Min., Steinies Approximately 160 per Min., Fresh-Water Temperature: 70F., Beer-Out Temperature: 75F., Cooling Water: 100 Gpm.

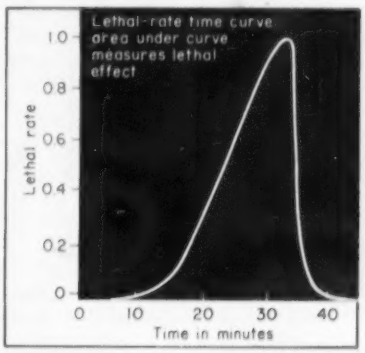
Zone	Rows of Nozzles	Time (Min.)	Spray Temperature (Deg. F.)	Beer-Out Temperature (Deg. F.)
First preheat	5	2.81	110	89
Second preheat	22(11)*	12.38(6.20)**	146	140
Pasteurizing	9	5.06	140	140
Precool	5	2.81	104	118
First cool	6	3.37	85	98
Second cool	6	3.37	78	86
Third cool	8	4.50	73	76
Fresh water	3(2)*	1.69(1.12)**	70	74
Totals	64	36.99		

*Indicates number of nozzles open in lower-deck compartments.
**Equivalent heat effect with some nozzles closed.

Prescription for

Pasteurizing Precision

Using double-deck unit, brewer achieves both uniform quality control and production flexibility, regulating process temperature for each type package . . . Procedure sped by carrying out calculations in terms of P. U. (Pasteurization Units)



C. A. DAYHARSH and H. W. DEL VECCHIO

Respectively, Chief Chemist and Assistant Chief Chemist, Jacob Ruppert Brewery, New York City

THREE YEARS of research on the pasteurization of beer have gone into the design and operation of our special double-deck pasteurizer at Jacob Ruppert Brewery, New York City. And another year has been spent in proving its versatility in production.

As a result, we now have a system that provides uniform and proper pasteurization of packaged beer—regardless of container size or type.

This is accomplished by controlling processing temperatures for each package unit according to a schedule based on our lethal-rate data for beer-spoilage organisms.

In cooperation with the Barry-Wehmiller Machine Co., St. Louis, special control valves were installed on strategic spray headers of both pasteurizer decks. In operation, some or all of these valves are turned on or off, depending on the item being processed.

The completed pasteurizing system affords these two important advantages:

1. Quality Control. We guard against under- and over-pasteurization. The former usually results in biological breakdown. Over-pasteurization, on the other hand, wastes heat and cooling water.

And this is very important: Should there be a failure in the pasteurizer alarm system, we can quickly calculate from temperature-recorder data whether or not containers have been sufficiently pasteurized. This minimizes time-consuming biological testing.

2. Production Flexibility. With this setup, each pasteurizer deck can be run independently. For example, quart steinies may be processed on the upper deck, while 12-oz. cans go through on the lower. And each item will receive proper heat treatment.

Furthermore, our research data enable us to determine how changing the speed of a deck affects the pasteurization level.

Compiling the Data

We launched our investigation to check the old standard pasteurization schedule (15 min. at 140F.) against what might actually be required in a modern brewery whose operations are carefully controlled. It was obvious that different-size packages could not be brought to the same pasteurization level by this procedure. Moreover, we suspected that former processing standards were too severe.

Lethal-rate studies* were conducted on various beer-spoilage organisms by methods used to establish processing times for canned foods. Laboratory and plant tests were run under conditions that favored survival of these organisms. Then, required pasteuriza-

(*Turn to page 230*)

* "Thermal Death Time on Beer Spoilage Organisms, I, II, III". American Society of Brewing Chemists Proceedings, 4/51 p. 45, 5/52 p. 48, 5/54 p. 141. Parts I and III by H. W. Del Vecchio, C. A. Dayharsh, and F. C. Baselt. Part II by first two authors.

Pertinent Tips From 12 Recent

High Court Decisions

LEO T. PARKER
Attorney at Law, Cincinnati

TO HELP FOOD EXECUTIVES avoid expensive legal controversies, and also to aid them in ameliorating those in which they may unavoidably become enmeshed, we here cite a dozen recent outstanding and representative higher court decisions.

We have shaped some of these case studies to answer specific questions put to us during our travels in the food field. Others serve to reply to particular queries from readers.

Court references of each case are added (in parentheses at the end of items) for the use of those who may need to delve deeper.

Buying Under Fictitious Name

First, this question posed by a man at a recent food convention: "In line with a current expansion program, our corporation would like to buy certain additional real estate. However, it's probable that the owner will ask a considerably higher price once he knows who we are. To avoid this, can we legally purchase the property under a fictitious name?"

According to a late higher court decision, if any corporation buys real property without disclosing its name and identity, the seller may rescind the contract.

In the case in question, the testimony related how the executive vice-president of a company authorized a real estate broker to buy specific property for $60,000. He further told the broker to withhold the identity of the buyer.

Thereupon, the latter contacted the property owner and told him that an "elderly person of means" wished to purchase his plot as an investment.

On this information, the owner signed to sell. But when he later learned that the company was the real buyer, he filed suit to rescind the contract.

The higher court held in his favor, saying: "It is a general doctrine that if either party to a transaction conceals some fact which is material, which fact is within his own knowledge, and which it is his duty to disclose, then he is guilty of fraud.

"Here, the broker deceived the seller. The statements may have been thought by him to be merely clever ways to induce the sale and yet follow the instructions of his principal. But his statements were at least constructively fraudulent."

This court further explained that a buyer, however, is not bound to disclose all facts which, if known by the seller, would tend to prevent his making the sale.

On the other hand, if either purchaser or seller makes any statement that tends to a suppression of the truth, or to a distraction of the other's attention from the real facts, then the concealment becomes fraudulent, entitling the defrauded party to rescind the contract. (238 SW., 2nd, 368)

Vital Trade Words

Another higher court has decided that a word or a term used in a contract of sale may have a special meaning, known to the trade, and that a court will recognize that meaning.

In illustration is the case of a buyer who contracted for a large quantity of "Washington U.S. No. 2, washed, Size A, Dinner Brand, Russet potatoes." On their arrival, this buyer saw that the potatoes were not clean, although the shipping point inspector had certified them as being "generally clean." Accordingly, this buyer made legal appeal.

The higher court thereupon held that the term "washed", used in the contract, had a "special coined significance" to mean washed clean, and that these potatoes did not meet this requirement. Hence, the purchaser was not required to pay for the shipment. Specifically the court said:

"Nowhere in the regulations is there a definition of 'washed potatoes.' We think that 'washed,' as used in the contract, has a special coined significance. A person who buys 'washed potatoes' is entitled to at least reasonably clean potatoes, because a premium is paid for 'washed potatoes.'" (227 Fed., 2nd, 67)

Time Limits on Debts

A reader asks this question: "How long must a debt run to become uncollectable?"

All states have statutes of limitations that "outlaw" debts and contracts after certain periods, generally 10 yr. However, according to a late higher court, if the debtor pays any sum on the debt, or specifically promises to pay, or confirms the obligation, then it remains collectable in the relationship of that date.

In point is litigation where it was brought out that in 1930 a shipper delivered 4,842 lb. of food products to a certain company's warehouse in Town A and 21,647 lb. to that same company's warehouse in Town B. Then, in 1936, the company wrote this man, saying it would pay him for the products stored in Town B.

But a number of years then passed without payment to the man's satisfaction. And so in 1946—just inside 10 yr. of the aforesaid letter—this man sued the warehouse company to recover the amount he felt to be due.

Last year, the higher court held in the shipper's favor relative to food stored in Town B, saying the letter written to him by the warehouse company in 1936 confirmed the sale and fell within the 10-yr. limitation of that state for suit for payment.

But since no such confirmation, part payment, or promise had been made in the period in relation to the food held in Town A, the court decided the warehouse company was not liable on this contract. (220 S.W., 2nd, 774)

Impurity-Charge Comeback

Recently termed void by a higher court was an injunction aimed to prohibit a manufacturer from shipping any of his products—even though court testimony revealed that his goods had been "misbranded" or "adulterated."

In this instance, Federal authorities had been successful in enjoining, through the lower court, a processor of butter, cheese, and cheese products. The company was forbidden to ship any of its products in interstate commerce for two years because of past adulteration of its goods.

However, the higher court to which the company appealed, judged that the injunction should not be approved. This court held that such an injunction violates all reasonable laws, since it denies the company such right to ship irrespective of the fact that it may now make products of acceptable purity. The decision read:

"It is surely conceivable that with its present equipment and personnel, the defendant could process products that are not adulterated, and if so, he should be permitted to have such products transported in interstate commerce. (160 Fed., 2nd, 816)

Shipping Unapproved Foods

Queries a reader: "Is a law that forbids shipping of uninspected or unapproved foods into a city, county, or state actually valid?"

"Yes," says a higher court. Either a state, county, or city may enact a valid law designed to safeguard the public against purchasing and eating unwholesome food.

For example, the City of Cleveland passed an ordinance that prohibited any person, firm, corporation, or association from bringing into the city, or having in possession, any meat or meat products not bearing the official inspection stamp of the city inspector.

The higher court declared the ordinance valid, saying: "We do not believe that such a regulation is unreasonable. The preservation of the public health of the municipality falls within the purview of local police power. The prevention within the municipality of the sale, and offer for sale, of unwholesome meat for human consumption tends to preserve the public health. (80 N.E., 2nd, 115)

Exemption From Labor Act

Another reader inquires: "Are employers exempt from the Fair Labor Standards Act when they hire workers to process fresh or perishable foods?"

Here, too, the answer is "Yes." And in reference is the case of a company producing apple juice and other products from apple peelings and cores received from dehydrating plants.

The higher court held that this company need not pay FLSA-specified wages, under the section of the law exempting employees engaged in processing perishable seasonal fresh fruits.

It considered the products applicable, since "the dehydrating and making of juice and pomace are all part and parcel of the speedy and continuous process of converting the perishable apple into a non-perishable salable product." (167 Fed., 2nd, 905)

★ Should you try to purchase land fictitiously?

★ How legal are trade definitions?

★ Can you still collect on that old debt?

★ Will past adulterations hold back your shipments?

★ Are your workers exempt from the Labor Act?

★ Must a cardiac case be compensated?

★ Just what is "ordinary care" of goods?

—These are only a few of the pointed questions answered here by Attorney Parker

Re SS Taxes

In comparison is the instance of a company that was compelled to pay Social Security taxes on its employees who were performing services in connection with the warehousing, handling, grading, and storage of food and agricultural commodities.

Here a suit was filed against the Government to recover these taxes. And the company proceeded to prove that more than half of the services rendered by the workers related to products supplied by a cooperative association.

The Federal court declared that the Government must return the taxes to the company. (157 Fed., 2nd, 633)

States vs. Non-Residents

"When, and under what circumstances," asks still another subscriber, "may a state law that constitutes a restriction upon non-residents be held valid?"

This is, of course, a broad question. However, some light is cast by the case of a state which passed a law requiring that all shrimp have heads and hulls removed before leaving the state.

This matter went to the U. S. Supreme Court, which decided that the specific state law was void—on the basis that it was unfair to other states into which shrimp are shipped. (278 U.S. 1)

Heart-Attack Case

Generally speaking, an employee cannot recover compensation for a heart attack.

Particular situations can, however, be complex—as in one recent case where a worker was injured while stacking canned goods. A case of cans fell upon the man's chest, knocking his breath out. Then about a month later, this employee suffered a heart attack while attending a ballgame.

The man sued for compensation, contending that the heart attack was caused by the original injury.

But in line with the State Industrial Commission, the higher court disagreed, saying: "There was competent evidence to support the finding of the Commission that the accident did not cause this disability. (265 Pac., 2nd, 470)

Need Tight Hold on Receipts

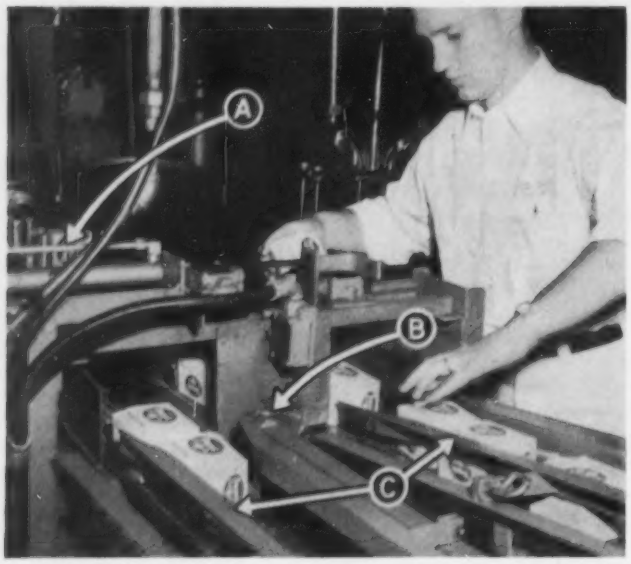
Modern higher courts consistently declare that a holder "in due course" of negotiable warehouse receipts can compel the warehouseman to deliver the merchandise represented by the receipts, irrespective of subsequently changed relationship or legal status of the warehouse company, or intermediate parties.

But according to a higher court, a trustee in bankruptcy is not legally such a holder, if the testimony shows the receipts were received from the bankrupt to secure a loan.

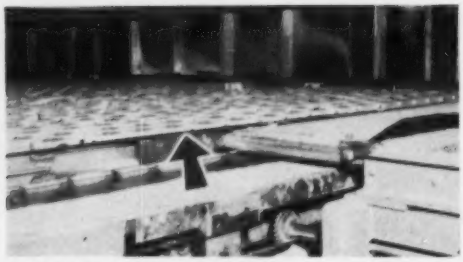
For illustration, a company's trustee in bankruptcy filed suit seeking to recover damages from a warehousing concern which he stated had failed and refused to deliver 224 tons of food represented by eleven negotiable re-

(Turn to page 143)

"Regimenting" Ice Cream In and Out of Tunnel



COMING FROM FILLER, single row of cartons (A) strikes plate (B) hooked to limit switches to actuate pneumatically operated diverter (behind plate) that alternately separates cartons into two moving rows (C).



CARTONS go into double-deck cooling tunnel (one deck shown). Hydraulically operated ram (arrow) automatically feeds in one row of cartons at a time.

AT DISCHARGE END, cartons slide onto transverse conveyor that carries them to bagging station. Cartons go either to storage or directly to trucks.

Gets Faster, Better Hardening

—with double-deck cooling-tunnel system that whisks ice cream from fillers, through air-blast freezer, to packing table . . . Volume zooms, space is conserved, Btu's saved

ROY HAIRE and JIM O'MEARA
Respectively, Manager, Ice Cream Division, Dean Milk Co., Belvidere, Ill., and Vice-President, W. M. Sprinkman Corp., Milwaukee

TROUBLE with hardening rooms is that they take too much space and time to hard-freeze packaged ice cream. This is even true with conventional hardening tunnels.

But the recently installed two-tier cooling tunnel at Dean Milk Co., Belvidere, Ill., has pushed aside these stumbling blocks—and more.

Here's a quick rundown of the new performance:

▶ **Speedier hardening.** Ice cream is whisked through the new hardening tunnel in 1¼ to 3 hr., according to size of packaged products. Range of products: Pints up to half-gallons in paper cartons, half-pints up to two-and-one-half gallons in plastics containers, and specialties, too.

Hardening in conventional rooms, on the other hand, may take up to 24 hr.

▶ **Less floor space.** Dean men say about 4,000 sq. ft. of space is conserved with this installation. Whereas, the hardening-room technique requires "room robbing" due to loose stacking of packages of ice cream, the bag-packed hardened ice cream is close-stacked—like a solid brick wall—in a low-temperature holding room.

And it's loaded onto pallets for double stacking—not possible with non-hardened, or not completely hardened, packages of cream.

▶ **Fewer Btu's for same amount of product.**

▶ **Better product quality.** Rapid cooling-tunnel freezing avoids "graininess" (large ice crystals and coarseness) and "coring" (soft centers). This shorter hardening time, therefore, produces a smoother ice cream.

▶ **High volume output.** Hourly production of ice cream, ready for delivery, has already topped the 1,000-gal. mark.

▶ **Greater flexibility.** Hardened, case-packed ice cream can either be loaded directly onto route trucks or held in low-temperature storage to await shipment.

The new system was engineered by W. M. Sprinkman Corp., Milwaukee, and the manufacturer was Conveyor Specialties Co., St. Paul.

Close Look at Operations

Let's see how the new cooling tunnel operates to save space and time and win these other benefits:

Ice cream drawn from freezers and filled into containers ready for hardening has a semi-fluid consistency—not stiff enough to hold its shape. Freezing is then continued in the tunnel until temperature of the cream drops in the center of containers to —15 to

(*Turn to page* 189)

when should you pay $13.00* a pound for TITANIUM?

The answer is *when its cost/life ratio makes titanium less costly than other metals*—as it often does. Look at it this way . . .

More Metal Per Pound—Titanium weighs only 56% as much as steel of the same strength. Where 50 pounds of steel is needed—28 pounds of titanium will do the job.

It's Final Cost That Counts—Fabricating takes the lion's share of production costs on most jobs. Considering material and fabricating costs together usually whittles down the titanium price differential to 2 or 3 to 1. And, most important . . .

Titanium Outlasts Most Metals—even those generally considered 'corrosion-resistant,' by 10, 20, even 50 times or more.

Added together, these facts often make titanium the most inexpensive material you can use. And only titanium can provide its exceptional combination of *light-weight, high-strength,* and *resistance to corrosion.* Ask a REM-CRU engineer to give you complete details about what titanium can do for you.

**The actual cost of titanium mill products varies with the grade, size and quantity ordered. The $13.00 figure is representative of today's prices for items used in commercial applications.*

To keep abreast of the latest developments on this vital metal, write to Dept. F-9 for the Rem-Cru Review—a free periodical presenting the latest technical data on titanium alloys.

REM-CRU TITANIUM

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ONLY "CONTROLLED" SEASONING can assure you an *economical, easy-to-employ, absolutely dependable* method of producing fine, uniform flavoring effects of any desired character for prepared meat, food or other flavoring purposes. We shall be glad to tell you more about FRITZSCHE'S "CONTROLLED" SEASONING BLENDS if you'll write us... Remember: *Your product is* ONLY *as good as its* FLAVOR!

Address our Flavor Division, Dept. FE, for further information on this more efficient seasoning technique.

FRITZSCHE *Established* 1871
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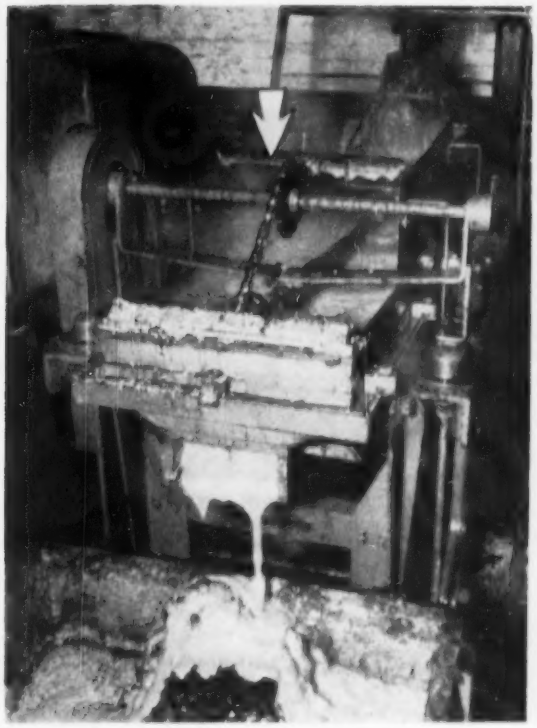


VISCOUS SYRUP feeds to gyrating sieve (rear) and passes through screen. Chain-brush (arrow) then sweeps foreign material into receptacle (foreground).

Gyrating Separator Licks Tough Straining Problem

By removing foreign matter from confectionery scrap, unit makes sugar recovery possible . . . Other food uses cited

HIGH-SPEED REMOVAL of foreign matter from re-dissolved scrap confectionery has enabled George Clark Ltd., Millwall, London, England, to efficiently reclaim sugar from the liquid product.

This is accomplished by a rectangular-deck gyration sifter equipped with a 100-mesh sieve. Unit is made by Russell Constructors Ltd., London. Similar machines are employed for straining ground cocoa masse, recovery of starch from maize liquor, and removing foots from edible oils. Used here are different mesh sieves.

Big Problem, Foreign Matter

In the George Clark installation, regular candy ingredients, colors, and flavors are removed from the scrap by special processes. But other matter, such as textile and paper fibers, cellulose film, foil, and glue, had presented real problems. The re-dissolved scrap looks, in fact, more like an intermediate product of paper making than a sugar solution.

However, the improved process, using the Russell Separator, has solved the difficulties of removing the unwanted materials.

3,000-Gph. Performance

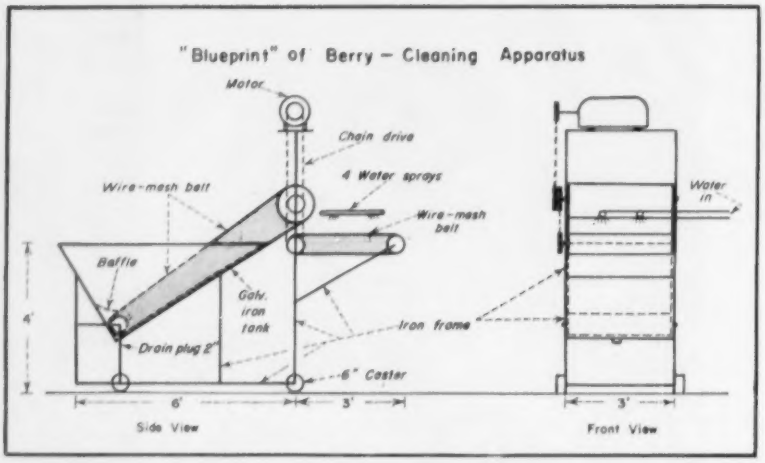
The technique calls for concentrating the syrup to about 68 deg. Brix. Then it is passed over the separator at about 3,000 gal. per hr. The sugar solution goes through the screen, while residues are continuously swept from its surface by a slowly moving brush (see photo). Residues are pushed over the end of the sieve frame and into a convenient receptacle or onto a discharge conveyor.

For this operation, the sieve frame is set at an angle to the horizontal, which hinders settling action at feed end, thus keeping the sieve free from choking, and at a minimum amplitude of gyratory motion.

Separator is 5 ft. 7 in. long, 2 ft. 9½ in. wide, 44⅛ in. high. Screening area is 6½ sq. ft. Unit is operated by a ¾-hp. waterproof motor, directly connected by a flexible coupling to an unbalanced flywheel, which generates the gyratory force.

Flywheel rotates at 1,450 rpm., and at maximum amplitude it generates about 3,800 lb. gyratory force. Degree of imbalance of flywheel can be adjusted to impart an amplitude of gyration at the screen surface varying from 0 to $\frac{5}{16}$ in.

For handling liquids carrying fibrous material in suspension, a flooded separator is available. In this machine, the straining operation takes place through a screen submerged in the liquid.



PORTABLE TANK-AND-BELT EQUIPMENT handles the operation. Cane berries go into tank filled with special wetting-agent solution, and they sink rapidly. Then inclined wire-mesh belt raises them out of solution and onto short horizontal belt. Here, sprays swish off the insects, along with other debris and wetting agent.

New Washing Technique Ups Berry Throughput

—By Routing Out Insects With Wetting Agents

Penetrating solutions banish clinging thrips without adverse effects on fruit quality . . . Equipment and method detailed . . . Principles apply in other food-cleaning operations

J. E. BREKKE, C. C. NIMMO, H. A. SWENSON, C. E. SAMUELS and J. R. BROCK

First two authors with Western Utilization Research Branch, Agricultural Research Service, USDA, Albany, Calif.; third author formerly with that facility; latter two with Department of Food Technology, Oregon Agricultural Experiment Station, Corvallis

IF FOOD WASHING is one of your operations, you may well be interested in a new method for cleaning berries—since the advanced principles apply generally to effective cleansing of any product.

Specifically, the technique has just been proved out in removing thrips—tiny insects—from cane berries. Key to the process, already adopted in a number of plants, is the use of a special surface-active solution that—

- **Wets the berries effectively to permit removal of up to 95% of the insects (adults and larvae).**
- **Has no detrimental effect on any of the fruits' quality factors.**

Initially, infested berries are passed through water containing about 0.1% of a non-alkaline, anionic wetting agent. Then a water spray and further washings remove insects, other debris, and the wetting solution.

Cooperative Project

For years, berry processors have been troubled by occasional but serious infestations of their fruits with thrips. Migrations of winged forms of this insect may occur before and during harvest, thus complicating field control. They lodge in concealed places, including the small drupelets of raspberries, blackberries, loganberries, and boysenberries.

Removing them from harvested fruit sometimes is the only way of saving the infested, but otherwise undamaged, portion of the crop. Unfortunately, ordinary washing procedures are only partially effective. For the larvae are particularly resistant to removal, being even smaller than adult thrips.

Hence the need for this improved cleaning method, developed when scientists of Western Utilization Research Branch (USDA) at Puyallup, Wash., and Albany, Calif., teamed with staff members of Oregon Agricultural Experiment Station in Corvallis.

Preliminary laboratory experiments showed that water washers of various types (shaker, whirlpool, or flume) and dry-riddle cleaners (with or without

blowers or suction) generally remove only 35-50% of thrips in heavily infested berries. Since the reason obviously was failure of the water to reach the insects, a wetting-agent solution seemed to be a logical approach to efficient removal.

Research with various commercial preparations revealed the effectiveness of anionic agents, such as sodium alkyl aryl sulfonate or sodium alkyl sulfate. When used in a dipping solution, they thoroughly wet the berries and enable commonly used washers to do a much better job of removing thrips.

Commercial Tests

Equipment was devised for larger-scale testing on a commercial processing line. It consisted of a galvanized iron tank and a continuous belt driven by a slow-speed motor. The tank was filled with a dilute solution of wetting agent.

One end of the belt rested near the bottom of the tank, immersed in the solution. The other end was out of the tank and so positioned that fruit fell onto a shaker washer in which clear water was flowing. Berries dumped into the tank sank when they were thoroughly wetted. Then the belt conveyed them up out of the tank and to the shaker washer.

When water alone was used, somewhat more than half the thrips remained on the berries after cleaning. As the concentration of wetting agent in the tank was increased, subsequent cleaning removed larger percentages.

Results of two seasons' studies are included in the table, which shows that larval forms of thrips are more difficult to remove than adult forms. The data represent several experimental runs in 1952 and 1954 with various concentrations of sodium alkyl aryl sulfonate. Insect removal ranged from 85 to 95% when berries first were wetted in the 0.10% solution.

It must be emphasized that these removal percentages were obtained with fruit having widely varying original counts. Therefore, the actual number of thrips remaining will depend on how many were present before washing.

The diagram shows construction details of a similar apparatus that has been used successfully in connection with a regular commercial berry-washing line. This tank and wire-mesh belt can be installed ahead of the water-washer.

Berries are then dumped into the wetting agent solution in the tank, where they sink to the belt and are conveyed up out of the solution. They drop onto the short-mesh belt running horizontally and are sprayed with clean water, which removes insects and wetting agent. Fruits then move from the short belt into an ordinary berry washer operating with clean water.

Commercial equipment closely resembling the dipping tank employed is available.

Operating Data

For a 150-gal. tank like the one above, 1.25 lb. of pure wetting agent or 2-3 lb. of a commercial preparation will supply the proper concentration. Alkaline detergents should not be used. A critical point is the concentration of wetting agent, which should be high enough so that berries will be thoroughly wetted in 5 sec. or less.

Raspberries will float in water for several hours, held up by air entrapped in the cup and between drupelets. But in a solution containing 0.1% of the sodium-alkyl-aryl-sulfonate type of wetting agent, they sink in 2 to 5 sec. (see graph). Wetting efficiency does not increase to an important degree with use of a concentration above 0.1%.

With red or black raspberries, strength of the solution in the tank can easily be checked by withdrawing a sample in a quart jar or a beaker, and placing a number of berries on the surface of the liquid. The time required for the berries to sink is then observed.

If they sink in about 5 sec., on an average, the concentration is in the correct range. Should sinking take 10 sec. or more, then it is too low.

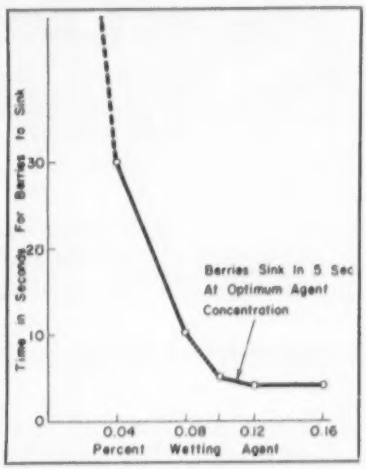
In the latter case, sufficient wetting agent should be added to the solution in the tank so that fruits sink in 5 sec.

For berries other than red or black raspberries, optimum wetting-agent concentration has not been determined. Those with receptacle attached (boysenberries, blackberries, loganberries, and similar berries) sink in water immediately, hence the test described above is not adequate. However, concentrations in the range reported (table) will be most effective.

Contents of the tank should be dumped every hour during continuous operation and the tank refilled with fresh solution.

Except for greater insect removal with the wetting-agent solution, yield of black raspberries from a line employing this cleaning method is essentially the same as that from a line in which only water is used. This is also

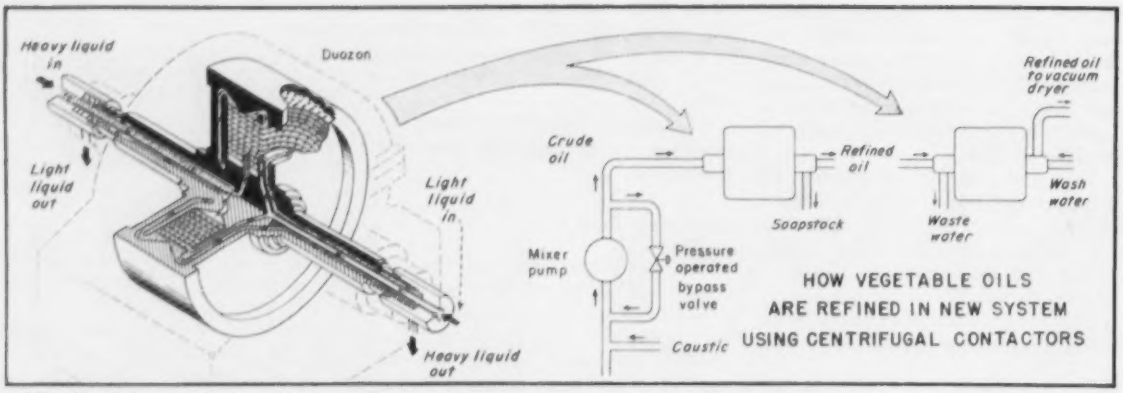
(*Turn to page 154*



GRAPH shows optimum agent concentration for berry cleaning.

HOW WETTING AGENT (Sodium Alkyl Aryl Sulfonate) Boosts Insect Removal

Experiment Runs	Percent Thrips Remaining		
	Adults	Larvae	Total
Black raspberries, '52 crop			
A. Water washed	53	79	71
B. 0.04% wetting agent	10	47	35
C. 0.08% wetting agent	8	34	25
D. 0.12% wetting agent	6	15	12
E. 0.10% wetting agent	6	27	12
F. 0.10% wetting agent	10	23	15
G. 0.10% wetting agent	6	20	12
H. Water washed	67	33	47
I. 0.10% wetting agent	9	14	11
Red raspberries, '52 crop			
J. Water washed	35	79	56
K. 0.10% wetting agent	3	7	5
Black raspberries, '52 crop			
L. Water washed	43	71	49
M. 0.05% wetting agent	12	45	23
N. 0.10% wetting agent	7	19	12
O. 0.20% wetting agent	8	23	13



ACTION of new, efficient multistage oil extractor is traced in cut-away (left). As indicated, it plays a vital part in continuous degumming and caustic refining of vegetable oils (flow diagram, right).

Latest Equipment and Methods Explored by Oil Chemists

New Techniques: **• Improve caustic refining of vegetable oils**
• Boost yields in screw-press operations
• Sharpen analyses for soap in edible oils
• Curb rancid odors in fiberboard packaging

Advances in refining equipment and techniques drew top interest at the recent annual meeting of the American Oil Chemists' Society in Houston.

Among the highlights: A new centrifugal extractor . . . Recent screw-press developments . . . A novel method for refining soybean oil . . . A conductivity test for soap in refined vegetable oils . . . And an antioxidant for paperboard containers.

Here are the details:

Multistage Contactor Ups Yield Of Refined Vegetable Oils

First off, is the radical departure from conventional centrifugal oil-refining equipment found in a highly efficient countercurrent contactor. This unit was developed by Podbielniak, Inc., Chicago.

It uses lower centrifugal force, yet removes greater amounts of gums and soaps, as revealed in a paper by W. J. Podbielniak, A. M. Gavin, and H. R. Kaiser.

In addition to boosting the product yield, it offers these significant advantages in the refining of glyceride oils—

1. Large capacity in a single machine, which reduces the initial outlay, cuts space requirements, and simplifies flow and installation.
2. Low costs for power and maintenance because of relatively low operating speed.
3. Virtually automatic operation that is continuous and unhampered by particles of meal in the charge.
4. A totally enclosed system that prevents oxidation of hot oil.

The stainless-steel unit, called Duozon, consists essentially of a horizontal enclosed rotor, steel base, and rotor cover (see cutaway). Its rotor is mounted on a shaft with ball bearings that are forced-feed lubricated. Inside the rotor are numerous contacting elements that provide for intimate mixing combined with low liquid velocity and controlled settling rates.

Heavy and light liquids are kept apart by pressure-balanced mechanical seals, two on each side of the rotor. They are designed for pressures up to 700 psi., temperatures to 300F.

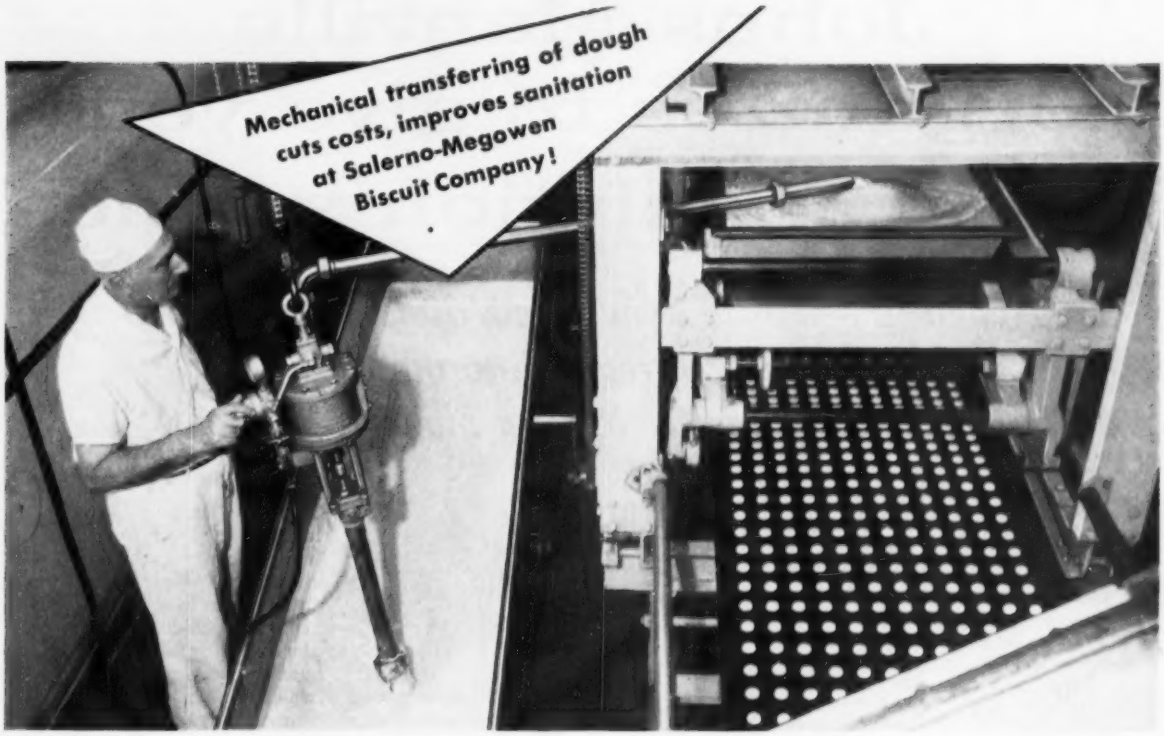
Operation Detailed

Light liquid enters through the shaft and goes out toward the rotor's periphery. Heavy liquid entering through the shaft at the opposite side is directed to the center of the rotor. Centrifugal force moves the heavy liquid outward, displacing light liquid toward the rotor's center.

When a semi-solid such as soapstock is processed, it coalesces on inner surfaces of the contacting elements, and as it builds up, moves to the periphery of the rotor. Here, it deposits on the V-shaped annulus that directs it to the spill-over sides of the rotor. From there, it goes to the shaft and is discharged through a seal-shaft annulus.

Light liquid moves through the contacting elements toward the shaft and is discharged. A back-pressure regulator automatically holds this liquid under pressure to control the position

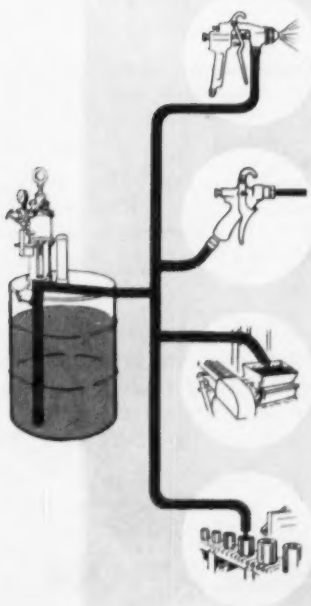
(*Turn to page 89*)



ALEMITE VERSATAL PUMP

saves labor, time and material

A typical Versatal System offers all these advantages!



Sprays . . . Hydrostatic or air. Everything from fluid to mastics!

Extrudes . . . Jams and jellies, shortening and many others!

Transfers . . . From original container to any machine on any floor. Serves multiple outlets!

Packages . . . Delivers materials to packaging machines. Fills automatically! Pressure is constant, controlled at application point.

Transferring vanilla wafer batter from the trough to this huge cookie-making machine by hand kept two operators busy full-time at the Salerno-Megowen Biscuit Company of Chicago. Now, with a powerful Alemite Versatal Pump, only one operator is required – *and he does the job much easier, in less time!*

Mechanical pumping with the Alemite Versatal System has assured more sanitary handling of material. With the elimination of hand methods, the hopper can be covered with a dust-proof lid – floors are kept clean and dry. Quality control is improved, because there is a constant, even supply of dough, without interruptions for refilling.

This is just one of many ways Alemite Versatal systems are saving money and improving sanitation in food plants everywhere. Let these modern, efficient pumps go to work for you!

Alemite Versatal Pumps Handle Dough, Lard, Shortening, Cake Icing, Jellies, Jam, Syrups, many others!

STEWART SW WARNER

ALEMITE Versatal SPRAY-PUMP EQUIPMENT

For full details, contact your nearest supplier or write Alemite, 1830 Diversey Parkway, Chicago 14, Ill.

Products of STEWART-WARNER CORPORATION

For more data, circle this page number on card at front →

Johns-Manville organizes to give you better insulation service

New and separate insulations division created to provide industry greatly improved Sales and Engineering service to meet modern problems

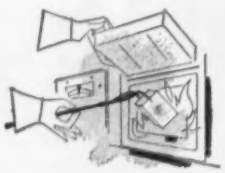
• Johns-Manville is now concentrating all industrial insulation operations within a new, fully integrated insulations division. This greater specialization makes possible the most complete insulation service available to industry. It consists of—

Sales Representatives . . . men on whom you can rely for your insulation recommendations. Your J-M salesman will help you select the insulating material exactly right for your job—the one that will provide maximum fuel savings, improved process control, and minimum maintenance. As co-ordinator of J-M's extensive research-engineering-manufacturing facilities, he offers you outstanding insulation training and experience.

Insulation Engineers—Backing up the J-M salesman on every job is the J-M insulation engineer. He is primarily concerned with solving insulation problems. He recommends the economic thickness of insulation, as well as the proper finishes, weatherproofing and securement. His highly specialized knowledge makes possible an intelligent recognition and handling of your individual insulation requirements.

Insulation Contract Units . . . Fully aware that no insulation is better than the man who applies it, the J-M Insulation Contractor makes care and skill in the scientific application of Johns-Manville insulations his stock in trade. He maintains a complete crew of estimators and mechanics trained in J-M application techniques. He is ready to give you fast, efficient service on any insulation job—large or small. Proud of his reputation for integrity in his own community, the J-M Insulation Contractor merits your complete confidence.

Complete Range of Products—In this day of exacting temperature control, the need for specific insulations for specific services is greater than ever before. Recognizing this, Johns-Manville manufactures insulations for every industrial requirement. Produced from the finest grades of asbestos, magnesium carbonate, diatomaceous silica, refractory clays and ceramic fibers, they are designed to afford maximum insulating effectiveness and durability at operating temperatures ranging from minus 300F to plus 3000F.



Extensive Research Facilities—At Manville, New Jersey, Johns-Manville maintains the world's most completely equipped insulation laboratory. Here insulation scientists are engaged in a continuous program of developing new and better insulating materials. In addition, their technical knowledge is always available to J-M customers whose insulation problems require special study.

Experienced Management—At headquarters as well as in the field, management of the new insulations division consists of men who, in line with J-M's promotion-from-within policy, are insulation veterans. With a realistic grasp of customers' needs, they are alert to new and better ways to serve you . . . now, and in the future.

On Your Next Insulation Job—Whether your next insulation job is big or little, simple or complex, let Johns-Manville handle it for you. Just call your nearest J-M sales office, or write direct to Johns-Manville, Box 14, New York 16, New York. In Canada, Port Credit, Ontario. *Chances are, you'll be glad you did!*

Johns-Manville *first-in* **INSULATION**

MATERIALS · ENGINEERING · APPLICATION

of the interface separating the light and heavy phases. However, this position can be varied while the machine is operating.

Pilot-Plant Results

To determine optimum conditions for degumming soybean oil, researchers at A. E. Staley Mfg. Co., Decatur, Ill., used a pilot model with 1-in.-wide rotor of 25-in. dia. Capacity was 1 gpm. (500 lb. per hr.).

They varied water-oil ratio, temperature, back-pressure adjustment, and speed in a series of tests.

At flow rates up to 3.5 gpm. and water rates previously used, product quality was superior to that obtained by centrifuge. Extracted lecithin had about 70% acetone insolubles (dry basis), and degummed oil had as low a Gardner break as 0.11%. At a throughput of 2 gpm., results again exceeded those of previous centrifuge operations, with a water treat considerably below the normal of 1.6%.

Success of these tests led to installation of production-size equipment with 15-in.-wide rotor of 36-in. dia. Automatically controlled, its rated capacity is 10 tank cars per day. In one run, the unit was operated for four months without interruption for maintenance or cleaning.

This unit has also been used for caustic refining of extracted degummed soybean oil and crude soybean and cottonseed oils. Preliminary results indicate a 50% saving over cup loss with degummed soybean oil. Savings for crude cottonseed and soybean oils were 24% and 40%, respectively.

And similar tests are under way on crude peanut, linseed, and coconut oils, also lard and tallow.

One refiner reports a saving of 0.8 lb. oil per 100 lb. processed in the degumming operation. And in caustic refining, there was a saving of up to 1.9 lb. oil per 100 lb. processed.

Continuous Caustic Refining

A typical setup for continuous caustic refining of vegetable oils is depicted in the accompanying flow diagram. Combined oil and caustic solutions are automatically metered to the primary machine, where soapstock is separated from refined oil.

Latter is then water-washed in a second unit where, after 6-8 extraction stages, it contains not over 10 ppm. of soap. The water wash has a maximum total fatty acid content of 0.6%.

Eases Soy-Oil Refining

A new process for refining soybean oil promises economic advantages over conventional alkali treatment, according to a paper by L. P. Hays and H. Wolff, of A. E. Staley Mfg. Co., Decatur, Ill.

The technique cuts overall loss of oil, eliminates the processing of soap stocks, and produces deodorizer distillates that are potentially more valuable than soapstocks.

Although very satisfactory for soybean and peanut oils, the process is, at present, less applicable to vegetable oils requiring alkali treatment for color removal, such as cottonseed and corn oil.

In operation, crude soybean oil is treated with small amounts of an organic acid anhydride, preferably acetic anhydride. Several other anhydrides were also found to be more effective than the free acid.

Next comes treatment with water, and gum separation. After washing, the break-free oil is suitable for in-

(*Turn to page* 190)

• • •

Letters to the Editor

Yes, Flavor Evaluation Has Long Way To Go

Dear Sir:

Re: "Flavor Evaluation Still Has a Long Way to Go [FE July, p. 46]:

A most interesting article. We feel, like John W. Mitchell, that most of the failures in flavor evaluation can be traced directly to *consumer reactions.*

In our laboratory, we have developed many scientific approaches to an understanding of how true flavor evaluation can be controlled. Basically, certain standards have been developed and are adhered to religiously. This is only the first step. It represents but 25% of the work to follow. Now we must carefully study the consumer reaction, not just in individual states, but in hundreds of cities throughout the United States—and even go so far as surveys in small communities.

A panel of four to six men or women, even though specially endowed with senses as to proper flavor value, just cannot tell what consumers want in St. Louis or Los Angeles. We have encountered definite consumer-reaction differences even in cities 12 miles apart. And in this particular case, the flavor evaluation and adjustment of proper formulae took a period of almost five months.

Perhaps a humorous, but true, story regarding flavor evaluation would be of interest:

A number of years ago, a large packing company in the South was interested in obtaining an outstanding frankfurter and wiener flavoring. The sausage superintendent (Master's degree in Germany) gave us considerable help. And through a careful survey of several large consumers, we formulated a flavoring that was tested first in our experimental kitchen.

At the packing plant, we ran several batches, and were told to come back next day when they would be taste-tested. Number one on the panel was the superintendent, who removed his cud of tobacco. Number two was a chain smoker of cigarettes. And number three was an inveterate cigar smoker.

A long story short: The seasoning was voted out as being too bland, etc. However, the management was not convinced, so it laid plans for a consumer reaction survey in several parts of the city. The results were surprising, and the firm tripled its frankfurter business in the next six months.

Today, this company resorts to the most rigid consumer surveys. Needless to say, it has been very successful.

Thus, as Mr. Mitchell puts it: "In a test situation there usually is strong evidence that the subject is motivated to respond as he thinks he 'ought to.' This may not reveal his true preference, or what he would do in a buying situation."

We concur that the psychology of human behavior and laboratory interpretation on a statistical basis play only a small role in flavor evaluation. Fundamentally, we feel that, if through proper consumer acceptance the product in question is successfully merchandised and meets with good demand, our goal has been reached.

Again, we say Mr. Mitchell has given many suggestions that merit thoughtful consideration.—*Mervyn C. Phillips, Vice-President, The Griffith Laboratories, Inc., Chicago.*

LIGHTWEIGHT trailer combines two payload sections (note separate doors). Each is kept at a different temperature, adjustable for food product carried.

Multi-Product Distribution Solved With

Dual-Temperature Trailer

Half-empty trailers and too many deliveries were a problem—until skilled design brought efficiency and economy back into the picture

A SLIDING BULKHEAD that divides a trailer into two compartments—each with a different temperature—has solved a costly distribution problem for Safeway Stores.

Operating an $11 million warehouse at Denver, the supermarket chain must service stores in the Rocky Mountain area with a wide variety of foods requiring varying refrigeration.

Formerly, frozen foods, milk, meat, etc., were carried in different trucks, making it necessary for two or three vans to visit each store. Often such trailers were only partially loaded, or wastefully carried products at temperatures lower than necessary.

New Body Is Answer

The multiple-temperature body developed by Timpte Brothers, Denver auto body builders, has now cut such excess costs and inefficiency.

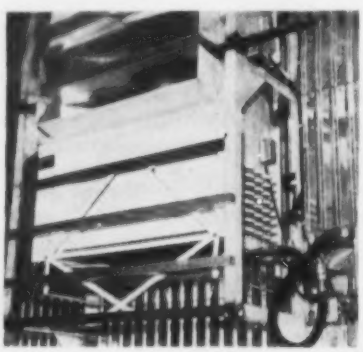
The new body follows standard van lines, measures 35x7x8 ft. Air-gasketed doors provide rear and side access. Aluminum construction cuts overall weight. An aluminum ribbed lining is covered with a special coating that guards against oxidation and cuts noise. Ribbing adds strength to the floor.

Two Transicold floor units (4,400-cfm circulating capacity each) provide refrigeration. One is mounted inside the front panel, while the other is two-thirds of the distance back on the left wall, slightly offset by the side door.

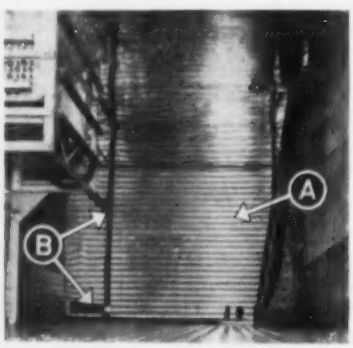
Refrigeration is developed by a Car-

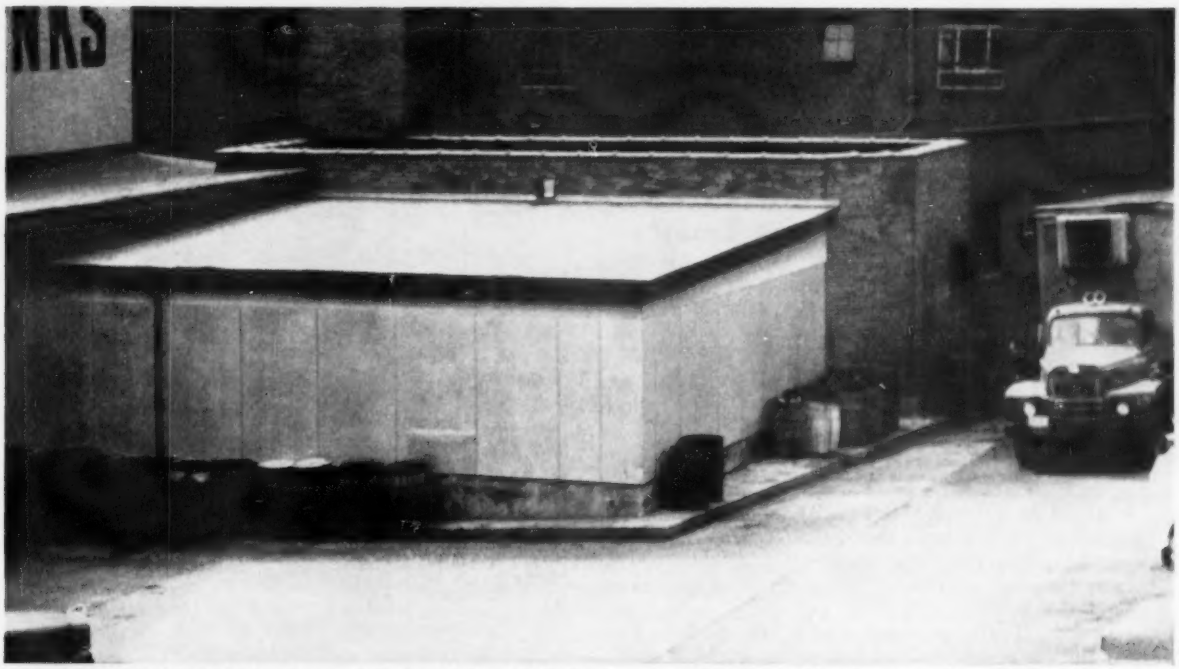
(*Turn to page 230*)

ONE OF A PAIR of Transicold units providing refrigeration for van. There is one in each section.



INSIDE VIEW shows bulkhead clamped in place (A). Note grooves in which bulkhead slides (B).





TWO ARMORPLY COLD ROOMS at Armour & Co. branch house in St. Louis are erected outdoors with only a protective roof. One keeps a constant 0°F., the other maintains 30-32°F. Metal faces of Armorply, by reflecting heat, help units hold temperature even on hottest days.

Now—sub-zero cold rooms you can erect outdoors—*quickly*

Armorply metal-clad storage rooms are low in cost . . . easy to expand

ARMORPLY WALLS AND CEILINGS stay clean with minimum care in locker of Armour's St. Louis branch. Room capacity can be easily increased by adding sections.

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Armorply storage rooms—as manufactured by Freezer Box Division, Annapolis Yacht Yard, Inc., Annapolis, Maryland—easily hold temperatures down to −10°F. The metal walls need no maintenance or painting; take wear and tear; can be hosed down to maintain cleanliness.

Most important, the installed cost of an Armorply cold box is no more than ordinary plaster-and-insulation units.

Armorply is waterproof plywood with a metal face permanently bonded on one or both sides. You can choose stainless steel, aluminum, lead, copper, or others. Armorply panels are light in weight, verminproof and impervious to moisture, remarkably strong and easy to fabricate. Armorply also finds wide use for supermarket Kroger-type doors, counterfronts and tops. Send the coupon for full information and a free sample of Armorply. Or see Armorply at any of our 87 offices in principal cities.

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Ole Sage Episode

Just Why Should a Foreman Continue to Study and Train?

IVAN C. MILLER
Associate Editor, "Food Engineering."

Foreman Bill Farrell lowered his cup with a bang! "That's swell for some of the young and ambitious," he frowned. "But there's lots of others who're good foremen and worth their salt, but who can't make the grade any further up—and maybe don't want to. That's where I fit."

"I TOLD FOREMAN BILL, HERE, that we Guff & Gripers both give it and take it," explained Tom Watson, personnel manager of Y&G Specialty Foods Co. "I said to him that we don't pull punches nor wear kid gloves.

"Also," he went on, "Bill knows what we're going to talk about. You'll recall that he cracked, *'Give me just one real reason, Tom, why, at my age, I should spend my nights studying.'* And of course that's what sparked our subject for today."

This was Tom's introduction of his guest—Y&G Foreman Bill Farrell—to the members of the luncheon club.

"'Twasn't meant as a crack—that statement I made to you, Tom," spoke up Bill Farrell. "It's this way: If I hadn't stopped studying when I left high school, I might be better off now. In fact, I admit I wish I hadn't been so dumb. But at my age now—married, a family, and—well, I'm just too old."

He hesitated, glanced around the group, then grinned as he added: "Even if this training is for free."

Everyone was sitting down for the first course. And there now were further greetings across the table to the second guest—Colossal Candy Co.'s Foreman Dick Duwell. Dick was making his second luncheon visit with Superintendent Luke Markham. He'd first attended shortly after achieving supervisory status.

"Dick, too, knows about our discussion on this," explained Luke as the meal proceeded, "so I hope he speaks up, says what he thinks, and asks questions."

He turned to Dick. "We G&G'ers don't claim to know all the answers, but we sure try to give the pros and cons a good going over."

This remark was just the right invitation for Batt Bulwark, works manager at Mull & Mull Co., so it wasn't long before he made the kick-off that opened the session. Nodding to Farrell, he blurted, "Bill, I came up the hard way. It was always 'roll out the production—or else'. I was lucky just to be on top of my job. I never had time or energy left for study."

Batt scratched his head quizzically. "And so," he boomed, "I'm inclined to agree with you, Bill—that to start studying again at your age, or mine, might be kind of crazy."

Bill's expression showed he was pleased. But before he could throw in a word of appreciation, Batt bellowed on: "Now, don't take any consolation from anything I've said," he emphasized with a resounding blow on the table. "Because before we leave here today, Ole Sage and some of the others that take his side may 'prove' that all through the years I've been a great student and, furthermore, that you and I are both fools if we don't spend the rest of our lives with our nose in a book like a college freshman."

Tom then broke in: "As usual, Batt's view is 'anti' and exaggerated. So let's quickly hear from at least one pro—someone who'll give 'one real reason' why a foreman should want more training, and why he should have a desire to study."

"One fact seems plain to me," volunteered Luke, "and from experience, too—my own. That's the big difference between foreman and superintendent. I believed it was worthwhile to make the climb to where I am. If I hadn't believed it, I could have avoided many extra hours of study and work."

"Gross exaggeration," rebuked Batt. "As misleading as the hay on a stick in front of a donkey's nose. Tom, what you're saying is, 'Just keep studying, learning, and training—and you're sure to become superintendent, then manager, and finally president.'" Batt slowly shook his head from side to side. "Now be honest—how many of your foremen can hope to become a superintendent, let alone manager or president?"

He went on: "In your plant, Luke, I'll bet that chances for a foreman to climb even one notch are less than 1 in 5—more likely 1 in 10 or more."

"Batt, how about over at M&M," baited Barney. "What are the chances of one of your foremen becoming works manager?"

At this, Batt leaned back in obvious satisfaction. "Zero!" he beamed. "I'm hard and tough and intend to outlive every foreman we've got!"

As the laughter subsided, Ole conceded that Batt had a point. "Only one person at a time," he said, "can fill the position of works manager at M&M. However," he continued, "that merely *limits* advancement opportunities. I'll remind you that most of us here climbed up from the ranks. We found the opportunities to advance—because

we wanted them and because we *had prepared* for them."

Dick Duwell now contributed: "Surely, there can't be advancement chances for all foremen who're willing to study and get sufficient training."

"Oh, you're quite right," agreed Ole. "But the proportion of opportunities in higher management today is far greater than when Batt and I were foremen. Furthermore, the ratio of management men to production workers will continue to rise."

Bill Farrell lowered his cup with a bang! "Swell for some of the young and ambitious," he frowned. "But there's lots of others who're good foremen and worth their salt, but who can't make the grade any further up—and maybe don't want to. That's where I fit."

"Bill has some real problems," explained Tom. "Home demands on his time, due to family illness, are almost the same as a full-time job."

"Bill's situation may well be an exception," remarked Personnel Manager Milt Sorenson. "However, I rather wonder on that point. It's my opinion that in most progressive operations, tomorrow's foreman, even today's, can't stay on top of their jobs without consistent training or study."

"Traveling in circles again!", blurted Batt. "Back where we started some months ago." Then he added sarcastically: "According to you, then, a foreman's reasons for putting in hours at training and study are just the same as top management's reasons for setting up the programs."

"Exactly, Batt", assured Milt. "Not only is the tempo fast today, but accelerated. Experience alone no longer does it. It could only be in a backward industry where a foreman could measure up to job requirements for any considerable period without study and/or training. Changes today are many times speedier than when you were a foreman, Batt."

"And here's another reason", injected Ole: "The foreman considers himself a part of management. He justly wants recognition and status. Yes, and association, too, with those at the top. But, if so, then he must measure up to management level in knowledge, know-how, and intelligence."

"Then foremen'll soon know more than the top brass," jibed Batt.

"Not according to a recent American Management Assn. study of how executives use *their* time," countered Ole. "All but two of the top boys questioned report that their work week includes overtime ranging from 8 to 20 hours. Among the reasons they assign for their overtime labors are 'to make time for reading, for planning, for meetings, to cope with problems of expansion, to handle labor negotiations, and to accept community responsibilities.'

"The survey further reveals that on the average 6 hours a week are spent on business reading, and 2 to 3 hours at outside business meetings, conferences, conventions, and the like."

Ole paused for emphasis, then made his point: "I consider all that to be study. And in my opinion, those men at the top are still 'in training.'"

At this point, Bill held up his hand like a school boy, to indicate he had something he wanted to say. And getting assenting nods, he made an admission: "I'm now beginning to see a few things differently. You see, I've been a sorehead—without reason, I guess—about something that happened last year."

He paused, as if to line up his facts, then resumed: "I fired a man. At the time, I was sure I was right. But it turned out I wasn't. The grievance went to arbitration—and our company lost."*

"The company backed you up, you know," reminded Tom, "even though it meant arbitration on a fairly doubtful case."

"Yes, I know," continued Bill. "However, it's been plenty rough on me since then. My department hasn't been quite the same. The whole thing has been a sore spot. I guess that's because the union—that is, one of the men working under me, the union steward—has been smarter than me. And I'm not the only one who knows it.

"I've learned that he studies a lot," Bill continued. "And everyone else seems to know that, too. So I see now that maybe a little study on my part might have saved me a mighty bad year."

Milt cut in. "I'll go for that—even just studying enough so as to be as smart as your union steward. But," he reminded, "let's not overlook the fact that we're no longer working a bunch of unschooled immigrants, like in the old days.

"Illiterates in industry are rare today. Most 1956 workers have gone through—or at least gone to—high school. What's more, here in this country where books, adult classes, radio, TV, etc., are so accessible, our employees are *exposed* to learning. And they do absorb it, study or not. The number seriously studying is also encouraging."

"Agreed," cried Barney. "Keeping ahead of the union stewards, and all the rest in the work force who are smart, is reason enough for a foreman to study. Yet what about this new fast-moving trend toward 'group management'? From what I've heard, those who try it don't drop it."

Barney paused to pull out a cigarette before querying: "Youve all heard about this group management plan and how it operates? Well, at first, it was just tried at the top, among the big brass. And now, since it seems to have worked, it looks like it might be valuable as far down as first-line level. I've even heard of one plan actually in operation at the foreman-worker level."

The two foremen, Bill and Dick, exchanged glances. Then Dick spoke up: "I think I see what's coming. You attend meetings with other foremen or with higher-ups. And at these meetings all kinds of problems are discussed. Very likely, a man finds a great many of the questions are 'way over his head. And even when most of the others don't know much more than he does, he nevertheless feels like a dunce."

Bill nodded agreement, and others around the table grinned their sympathy. Then Dick concluded: "Looks then like study may be necessary just for peace of mind—for security, that is—just to keep your grasp of the job, whether or not you have ambition to climb up."

"I've an idea," encouraged Ole, "that you already have your eye on the next step up. I hope so. And here's power to you."

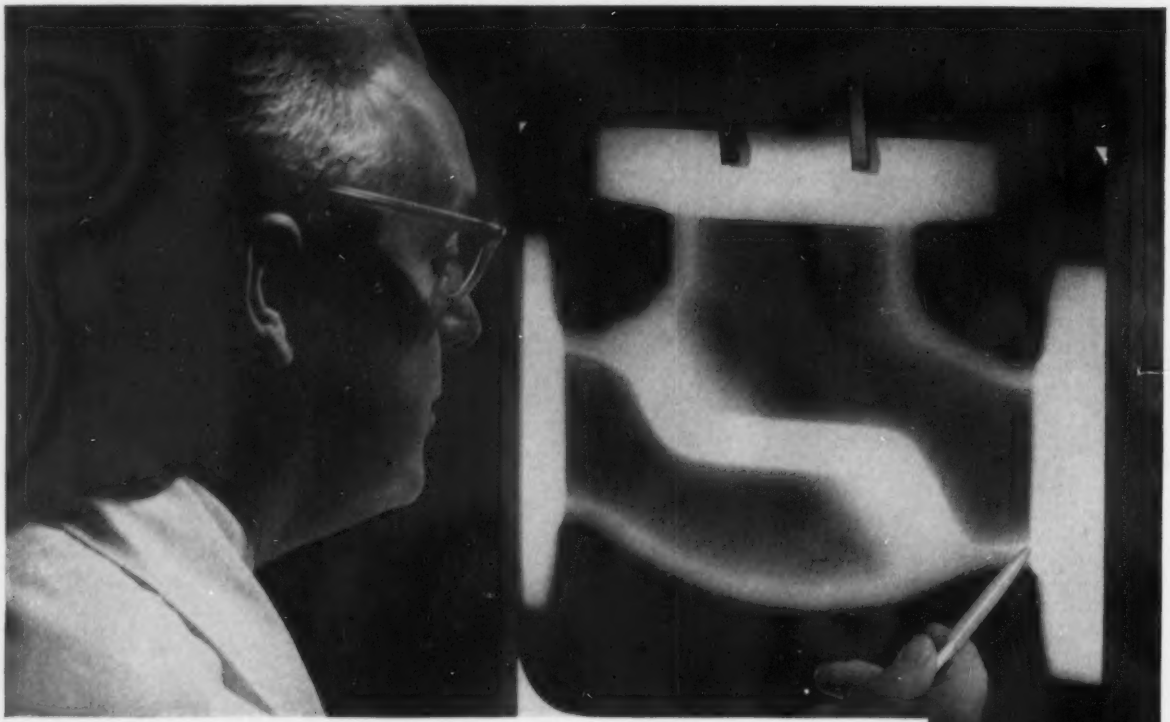
Then, after dumping the ashes from his pipe, Ole summarized: "Though our particular aim has been to advance reasons why *foremen* should study and train, most every

BATT BULWARK WAS SARCASTIC

". . . So here's Tom's idea," he scoffed contemptuously: 'Just keep on studying, learning, and training—and youre sure to become superintendent, then manager, and finally president.''

Ole Sage, however, was calmly approaching the question from a different direction — accenting actual ratios of opportunity. Also, the factors of recognition and status. And self-gratification, too.

* Related in Ole Sage Episode, Sept. '55, p. 113.



Inside story:

Valves may look alike on the surface. Their performance is another story. And the inside story of Powell Valves is that *every* Powell Valve has *Performance Verified.*

X-ray and gamma ray inspection—examining the very structure of the metal itself—are two of the many ways that Powell can make absolutely certain that Powell Valves will give *dependable* flow control.

Every part of every valve must pass rigid inspection. As a final step in manufacture, every Powell Valve is subjected to *an actual line test.* Because of Powell's pains-taking quality control, valve repair is cut to the minimum and plant shut down through valve failure is substantially reduced. Records from refineries, power and industrial plants the world over prove it.

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PERFORMANCE PV VERIFIED

FIG. 2453 G—Stainless Steel O.S. & Y. Globe Valve for 150 Pounds W.P.

FIG. 2475—Stainless Steel O.S. & Y. Globe Valve for 150 Pounds W.P.

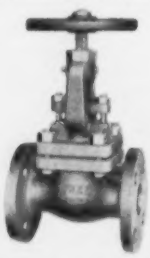
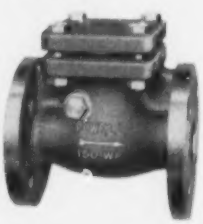


FIG. 2342—Stainless Steel Bolted Cap Swing Check Valve for 150 Pounds W.P.



POWELL VALVES

BRONZE, IRON, STEEL AND CORROSION RESISTANT VALVES.

reason brought out applies to *all* of us. And here's one more angle before the meeting adjourns: Not alone foremen but all of us should want training and should make use of our opportunities for study—if only for *self-gratification*.

"The insight and understanding that comes through study is always a source of satisfaction. It sustains a person off the job as well as on. One cannot know and fully appreciate the values—the compensations of learning—without the experience, which of course is greatest when it extends throughout most of one's life.

"So, I recommend to you all—the youngest of you and the oldest, too: Study whenever possible, until you know the gratification it can bring. Then, I know you'll never stop."

From Ole's Notebook

Upping Tech Men

Today's technically trained managers are people who somewhere along the line became interested in trying to solve management problems.

But it's not enough to wait for the technical man to become interested in management of his own accord. Too few would come up on their own.

Rather, industry must motivate technical specialists to become interested in management problems, and then train them in the skills which previously they have ignored.—*George Trimble, Vice-President, Engineering, Glenn L. Martin Co.*

Management in Depth

To build management in depth means to develop a reservoir of capable sub-executives trained and ready to step into the shoes of their superiors.

There are three principal reasons for failure to follow this policy

The executives involved may be apathetic about the future of the company or their departments. They may be afraid to train subordinates who might take their jobs. Or they may be so busy with day-to-day operations that they lack the time or the patience to teach those around them.—*Roy C. Ingersoll, Chairman of Board and President, Borg-Warner Corp.*

Where Joint Training Pays

"Under the proper circumstances, it is all right to provide training courses for your foremen and stewards together. If you have had a long and raucous session with the union, you are not going to accomplish much through just a little booklet . . . but in some areas joint foremen and stewards training courses are working like a charm. They pay off."—*Herbert O. Eby, Labor Relations Director, Pittsburgh Plate Glass Co., before California Personnel Management Assn.*

"Makings" of a Leader

If a foreman succeeds in becoming a leader of his group he is the boss. If he fails to be the leader he is in trouble.

This is aside from what the organization chart reads or what top management wants. For despite his title, he may not actually be in command.

How then does a supervisor become a leader:

1. He must know and understand what is to be done.
2. He must support the task ahead enthusiastically, and also be able to interpret it to his group, in turn.
3. He must be responsive to the sound ideas, interests, and feelings of the group, and also should be enthusiastic in fighting for them.
4. He must be the leavening for the group, resisting the temptation to support his own wishes or those of his favorites, and having the courage to bring the contrary-minded into line.—*Gerry E. Morse, Panel Member, California Personnel Management Assn.*

Good Climate for Foremen

Conditions of the supervisor's job are often such that he cannot possibly exercise the qualities of leadership expected of him.

Before management mounts an extensive "program" for improving the foreman's human-relations abilities, it needs to take a long hard look at the operating problems that are beyond his immediate control and which lead to human-relations friction.

It must also consider the limited time the supervisor has for essential supervisory duties.

By trying to improve the man before it improves the job, it only puts the cart before the horse.—*Robert H. Guest, in "Personnel", publication of American Management Assn.*

Automatic Lubrication

—*Continued from page 61*

flashes a warning light when the oil level reaches a critical stage. Then when it reaches a minimum safe level, the machine is automatically shut down and cannot be restarted until the supply has been replenished.

On high-speed automatic cartoning machines made by Dacam Corp., Charlotte, N. C., problems of machine breakdown have been minimized by installation of centralized lubrication systems, built into the machine at time of manufacture.

A critical point of Dacam's Visitainer beer-can cartoner is the drive shaft. When oil applications are too little or too seldom at this point, risk is run of freezing the entire drive mechanism and stopping production for several hours. This could cause a pile-up of thousands of cans of beer coming down the production line.

The automatic system used on the Visitainer is a cyclic type, feeding 2.2 cc. of oil every 18 min. to 45 bearings on the drive mechanism. Important bearings lubricated include unit's glue-application mechanism, slides, helical gears, and chain drives.

Systems properly engineered to suit the specific needs of a machine and installed during assembly are not expensive. The extra cost is often more than paid back by savings effected during the first year of operation.

Many packagers who have automatic lubrication subscribe to the thought: "If you need automatic lubrication, (and who in packaging doesn't?) you're paying for it now!"

End (*Resume reading on page 62*)

Forced Fumigation

—*Continued from page 74*

rates of 800 to 1,200 cu. ft. per min.

Similar experiments were conducted with popular liquid grain fumigants. Gas analysis was not made because it was felt that the blend of chemicals would not give a true interpre-

tation of conditions. Test insects were used to determine the effectiveness.

Forced air fumigation was then tried. This obviated need of the return duct and made sealing of vents at bin tops unnecessary. Good distribution of fumigant was attained by drawing it through the grain without recirculating. It was sprayed into the top of bin, with a pull-out from the bottom (exhausting into space) until the gas was distributed.

As a result of these tests, we modified several bins for routine forced air fumigation.

▶The research indicated that the "new technique" would control grain insects at a very nominal cost. And as for performance, laboratory analysis of test insects revealed a kill of 99-plus percent.

▶During the routine operations that followed the experimental phase, more than 3,000,000 bu. of grain were fumigated at a cost per 1,000 bu. of $1.66 —in contrast to $4.41 under the old technique.

It is to be noted here that even the so-called old technique was semi-automatic, with the chemicals purchased in tank carlots and pumped from storage tanks to grain.

Further reduction of costs below the $1.66 figure are hoped for by the purchase of chemicals in larger quantities, with volatilizing of the gas before introduction to the grain, and additional automatic features.

"One-Time" Technique

This method that we now have in routine service involves a one-time pass of the fumigant through the grain. Methyl bromide at proportion of 2 lb. per 1,000 cu. ft. of bin space, is introduced into the top of the bin above the grain. The exhaust fan is started about 15 min. before the fumigant is released and allowed to operate 75 min. after gas exposure has begun.

Optimum length of time for fan operation was determined by gas analysis studies during the experimental period. After an exposure period of 24 hr., the fan is turned on for an additional 3 hr. to exhaust the fumigant from the bin.

In order to simplify the procedure, several bin hoppers have been connected to a common trunk line, with slides to control the air movement. The fan is mounted on a railroad push car so that it can be moved from one trunk line to another. A 10 hp. motor drives the 26-in. fan.

Chemicals used to control insects offer a certain amount of hazard to man. Accordingly, an industrial hygienist conducted studies to check on gas leakage under the new technique, and it is felt that the method now in use is safer than the former way.

Under the Miller Bill, tolerances have been established for certain chemicals. Any person using insecticides and fumigants should be familiar with the law and keep up to date on the approved tolerances.

The procedures described were adopted to silos of extreme height. Modifications will be necessary in bins of less height and more width.

Our aim in this article has been to indicate how one company has been able to reduce costs, yet maintain quality. Meanwhile, our research continues, using other chemicals yet staying within the safety tolerances.

End (Resume reading on page 77)

Speed Line Layout

—Continued from page 43

can be followed, if desired, to provide an accurate elevation of any or all of the production lines.

By thus combining the 2D models in the two basic representations—one the plan, the other the elevation—you get an accurate and efficient equivalent to 3D-model layouts.

With the lines installed in tentative locations, it's time to populate them with people. This can be quite practically accomplished by employing small bead-headed pins. These, too, should be selected in various colors, to designate different types of operators, or operations.

This planning for employees as well as equipment in the layout, assures assignment of the necessary work space. And it may reveal faulty allocations—areas that are too limited or, on the other hand, areas unnecessarily large and thus wasteful of space.

There may also be indications of positions having a surplus of workers—or not enough. And maybe possibilities will be noted for adding other operator functions.

In effect, your use of the 2D's is foundational. For after the model layout has been thoroughly checked and deemed acceptable—with all revisions in—then the information can be transferred to engineering drawings and blueprinted to provide working instructions for erection and installation purposes.

Although the 3D's can be supplanted by these low-cost 2D's for laying out your lines and locating your equipment, you may still find great value in following up with specific 3D's. These can aid in arriving at the most satisfactory design for single units of equipment or component units of an assembly that is in the design or early construction stage.

Such 3D models will serve to reveal the less obvious faults in design, while perhaps suggesting more suitable materials of construction or simpler approaches to solve a particular problem.

Also, 3D's provide a springboard for instituting innovations for new efficiency.

End (Resume reading on page 44)

Supplee Solution

—Continued from page 49

tle and gently lower it into the case.

First step in operation of the system is converting the single line of filled and capped bottles being conveyed from the filler into three parallel lines. This is accomplished by a "diverter" in which two out of every three bottles are moved from the center conveyor and placed on the adjacent ones.

Next, bottles are assembled in groups of twelve quarts or six half-gallons on a horizontal rack which moves them over a previously positioned case. Then the twelve fingers rise through the bottom of the case and lift the bottles from the rack, enabling it to retract, ready to receive another group.

When rack is out of the way, fingers lower bottles into the case and move down far enough below to clear its bottom. Filled case is then discharged to conveyor that moves it to the cold room, and an empty case is automatically positioned in the caser.

By a simple changeover, requiring only a few minutes, unit can be easily adapted to case half-gallon bottles—six to a case.

Capacity of each of the two casing systems: Quarts, 144 per min., half-gallons, 72 per min.

End (Resume reading on page 50)

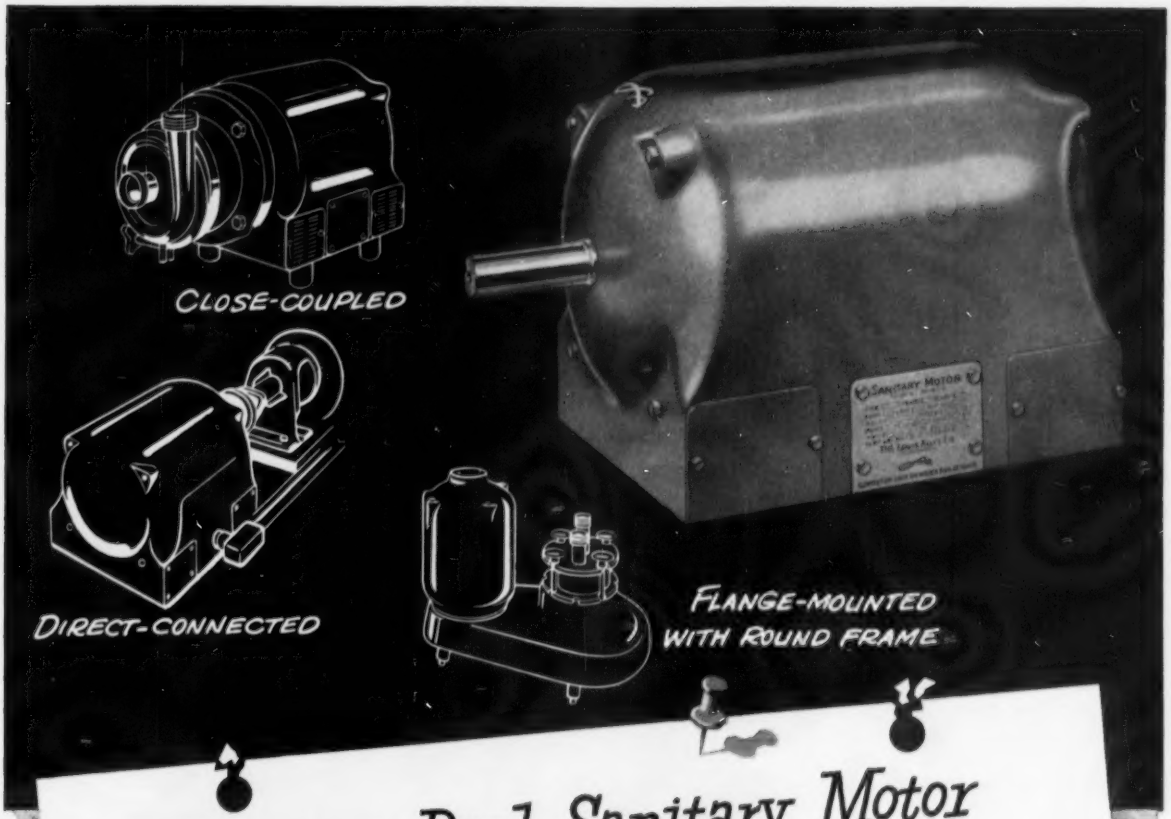
MIT Answers SMI

—Continued from page 51

in this fish. And test scores do not drop 50% until 40 weeks have elapsed. It is also notable that mackerel and salmon are even more susceptible to quality changes.

"Concentrated orange juice held at 10F. for 4-5 months has only 50-60% cloud retention on reconstitution. Also, product develops off-flavors through oxidation of volatile oils. Yet this product can be held for 12 months at 0F. without any significant changes in flavor or consistency.

"With regard to vitamins, peas re-



Here's a Real Sanitary Motor You Can Install Anywhere

...designed and built by Louis Allis, it is splash-proof, vermin-proof, and streamlined

The Louis Allis Sanitary Motor is built to meet DISA specifications. It's completely streamlined—has smooth contours without cracks, crevices, or depressions to collect food particles. It's easy to clean and even has a built-in conduit box for the greatest possible sanitation. And it's versatile in three important ways:

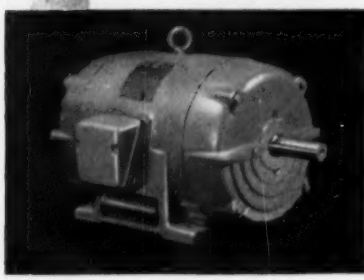
1. Louis Allis makes it in a wide range of sizes and mechanical modifications to suit any application: Sizes from 1/3 to 40 hp. "C" flanges. Round frames. Special shafts and shaft extensions.

2. Because this motor is completely splash-proof, you can wash it down with a hose—no water can enter the motor to cause winding damage. Install it wherever falling or splashing liquids are present.

3. It can be installed in many ways, too. It can be close-coupled, direct-connected, or flange-mounted with round frame.

With all this versatility, you can put it anywhere—for maximum sanitation throughout your plant.

Your Louis Allis field engineer will be glad to help you with any installation problems—just ask him. Write us for Bulletin 711 describing this motor in detail.



A complete line of standard rerated motors in frames 182 through 326U now in stock. Special rerated motors are available on short delivery.

SY-101

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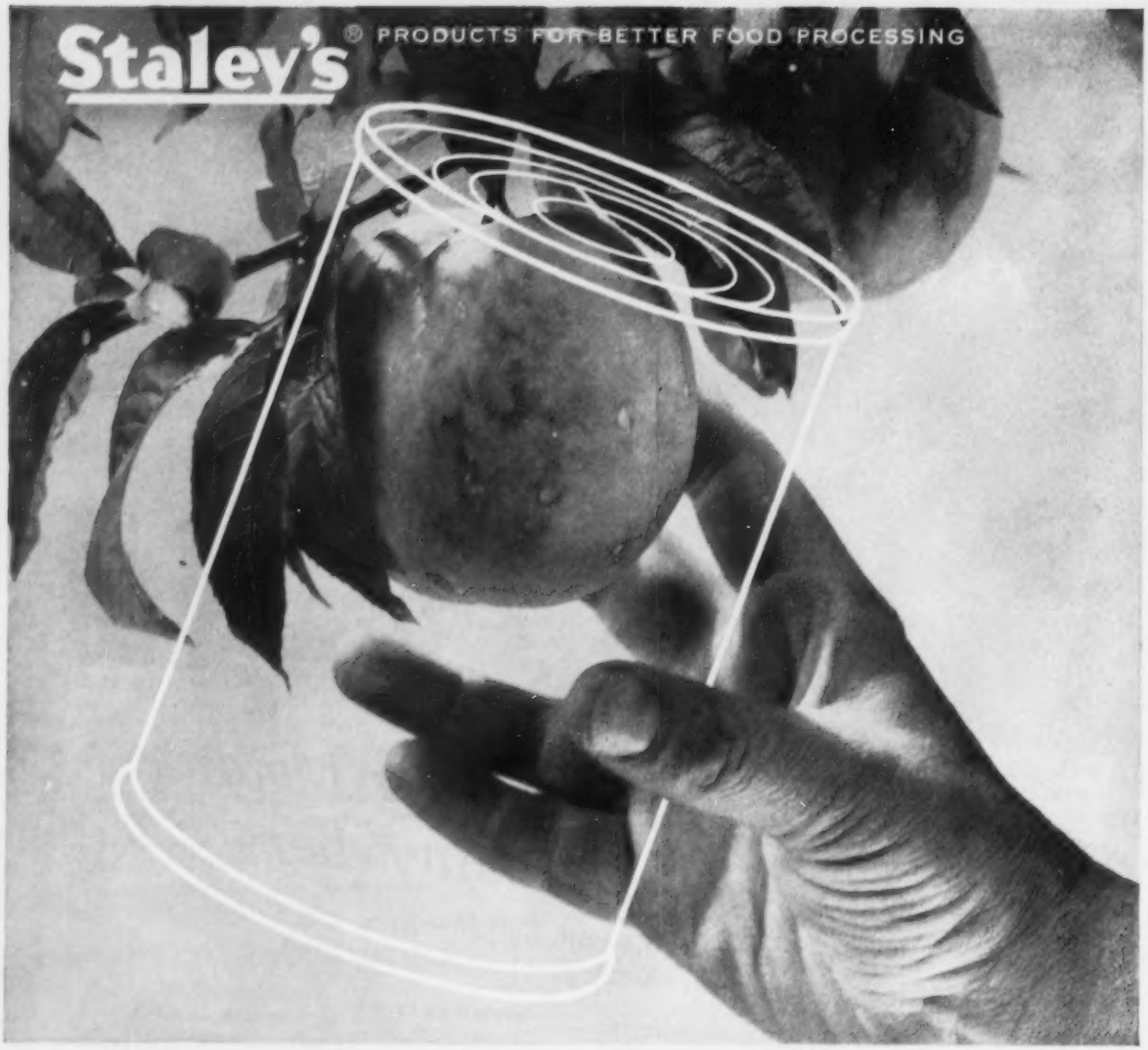

How to capture and hold natural fruit colors at their peak...*and keep them from "fading"*

Easy low cost way to give your brand that "fresh-picked" look —the kind Mrs. Consumer buys again and again and again

It's disheartening, isn't it? Disheartening to have those bright, mouth-watering colors of your highest grades—so eye-appealing when they were packed—become discolored by the time Mrs. Housewife serves them. And it's so unnecessary, too, thanks to Staley's Sweetose Enzyme Converted Corn Syrup.

For Sweetose holds maximum color . . . gives better gloss . . . retains the "sheen" that says *your product* was fresh picked. That's because Sweetose better protects the "natural pigments" in your red fruits . . . retards the oxidation of Vitamin C that causes "browning" . . . contributes other appetizing appearance factors as well.

Get *all* the facts. Learn how Sweetose and Staley's bulk handling system not only speeds production, cuts costs—improves flavor, body, quality—*but* steps up your sales by holding natural fruit colors. See your Staley Representative or write, wire or phone today.

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PRODUCTS FROM CORN
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AND SOYBEANS

OTHER QUALITY PRODUCTS
Regular & Intermediate Corn Syrups
Canners Starches
Refined Corn Oil
Zest®, Monosodium Glutamate
Sta-Sol® Lecithin

tain only 35% of their blanched vitamin C content when stored at 10 deg. for a year. But 80% is retained at zero F. Color and flavor changes follow this pattern, too, both in peas and other vegetables.

"In meat products, quality follows storage temperature in much the same way as in vegetables. Here, some changes are indicated by loss of color, excessive drip during defrosting, toughening in ground meats, and loss of succulence in pork and poultry."

How to Keep High Quality

What about this situation?

The MIT researchers had some definite suggestions, Dr. Nickerson leading off:

"If it were possible to store frozens at −40, there would be no problems. Unfortunately, such conditions are not economical. But it is possible to maintain a temperature of 0F. except for the relatively short movement from packer to warehouse. And with few exceptions, this temperature is low enough to prevent any but minor deteriorations during a storage period of a year.

"In order-assembly rooms, there is no economic reason why temperatures need be higher than 0. And to help, products should not be stacked on floors, against walls, or in blocks that interfere with good air circulation.

"Moreover, frozens should be moved through these stations with the greatest possible speed to avoid quality-deteriorating conditions.

"If delivery trucks are night loaded, adequate refrigeration should be provided to keep temperatures low.

"In long-haul trucks, refrigerated with dry ice, as much as 1,000 lb. of this material must be used at a time and a consumption rate of 25-30 lb. per hr. is necessary to maintain proper temperature.

"Refrigeration deficiencies in all trucks usually stem from too little refrigeration, imperfect application of refrigeration to load, poor air circulation, and inefficient insulation.

"Finally, while it is often argued that better handling methods cannot be used economically, the straight fact is that the most prevalent abuses in handling of frozens, today, are not the result of economic duress—but stem mostly from ignorance and indifference."

Other angles on this vital subject were stressed by Dr. Proctor. "No one in distribution knows how long frozens have already been stored when they are received in a specific area. Yet the elapsed time and storage temperature determine largely how much longer they can be kept."

He continued: "While troubles of high storage temperatures have been stressed, fluctuating temperatures are also very detrimental. A recent study shows that cycling temperatures between −10 and 10F. are more damaging than storage at a steady 0 deg. This is particularly true for frozen gravies, custards, and pre-cooked foods, containing starch, eggs, and milk."

Uniform Code Would Help

Dr. Proctor indicated that production dates—placed on the package by processors, and understood by distributors—would help on the first problem. "But," he said, "they are neither popular nor common today.

"It would be wonderful if every food package contained a tell-tale visual warning to signal when frozens have been subjected to thawing. And much effort has been directed toward this end. But an adequate device that can be seen on the outside of the package has not yet been developed.

"Best alternative, to date, is to put a small, thin, distinctively shaped piece of ice, in a plastic bag and place it in the package. If this ice melts, it loses its shape, and will not regain it again on being re-frozen. Such indicators have been used for nearly a decade in some products.

"Trouble is, if they are placed *outside* the package, where they would be visible and thus of value to distributors, they may melt before temperature rises to the point where the product must be discarded."

Dr. Proctor advanced this eleven-point program to boost storage life and quality retention of frozens during distribution:

1. Have one person responsible for maintenance of proper storage conditions.
2. Make laboratory checks on products suspected to have thawed.
3. Check storage temperatures and keep records—preferably on automatic recorders.
4. See that proper dunnage is used during shipping to insure adequate air circulation.
5. Keep a time-temperature record on each large shipment.
6. Precool trucks and keep them under refrigeration.
7. Keep backroom storage below 20 deg., or even lower if frozens are there for over 1 hr.
8. Put older stock at top of retail cabinets.
9. Keep frozen foods below load level line in cabinets.
10. Have thermometers in all display cases, with alarm signals that ring if temperatures rise too high.
11. Put indicators in frozen packages.

Functional Package Vital

Retailers at the seminar were also informed on how packaging plays a key part in frozen-product protection.

There must be increased emphasis on the functional selection of packaging materials, according to Marcus Karel of MIT. Packages should be specifically designed to stop transmission of oxygen, water vapor, and odor and flavor constituents.

Here's his nine-point checklist by which processors can determine if their packages are up to standard:

1. Permeability of the package to water vapor should be low.
2. Package should not allow passage of liquids.
3. It should be impermeable to fats and oils.
4. Resistance to acids, and other corrosive food components, is required.
5. Low permeability to oxygen is a "must".
6. It should exclude foreign odors, and prevent transfer of food flavors.
7. It should have high resistance to mechanical damage. And it should be made of materials having high tensile, tear, and bursting strength.

Especially important for frozen food packages are materials that maintain their desired mechanical properties at low temperatures, are not affected by temperature fluctuations, and have good wet-strength.

8. Its seals must remain tight under varying handling conditions.
9. Flexibility of film-wrap packages should not be affected by low temperatures.

In key Q & A sessions following each MIT talk, there was outstanding participation by the 4-man Super Market Committee—S. L. Seleznow, Food Fair Super Markets; H. Kline, W. W. Wilt Co.; L. B. Smith, Jr., Thorofare Markets; and G. Vander Hooning, Van's Food Department Stores.

They fired pertinent questions that drew out additional clarification from the researchers on the challenging points. And their queries showed an earnest determination to "get clear" on ways to apply food technology in marketing.

In this regard, the marketers were aided by the presence of Prof. A. L. Hesselschwerdt, Jr., MIT refrigeration expert, who gave sound backing to the other speakers on the economic practicality of maintaining 0F. temperatures in retail and distribution storage spaces and trucks.

End *(Resume reading on page 52)*

In Behalf of Progress . . .

Packers Must Act on Frozen Food Problem

Frozen foods have made nice gains. Yet were it not for "glamorous" new items, the trend would not be anything to get excited about. Actually, frozen foods have not done as well as they might.

Here's why. Quality too often deteriorates in distribution channels. Excessive temperatures in transportation, warehousing, and retailing have taken their taste tolls. This has cost business.

That is not news to leading packers. They have long been aware of the situation. National Association of Frozen Food Packers has held many sessions on the subject at its annual conventions. And it has prepared educational literature for distributors.

An example is the highly instructive, yet concise, little booklet "Protecting Frozen Foods from Producer to Consumer." The Association financed this, and more than 125,000 copies have been distributed to packers, wholesalers, and retailers.

Individual packers have fought the problem, too. Some, like Minute Maid, have put food technologists into the distribution field to check up, and to educate. Others, like Sea Pak, have run down the source of quality complaints through field investigations by technical men.

Yet the situation continues to be serious. This is recognized by NAFFP. And it was dramatically highlighted at the recent symposium on frozen food quality held jointly by Massachusetts Institute of Technology and Supermarket Institute, at Cambridge.

At this session, John T. R. Nickerson, MIT food technology professor, branded present transportation facilities as "not good." Both he and Prof. B. E. Proctor, department head, cited many recent instances of product temperatures as high as 40 deg. F. in truck shipments, order assembly rooms, retail storage, and display cabinets (see p. 50).

Now here is a surprising thing, and one that points the finger at the core of the problem. Through systematic interview of brokers, distributors, and retailers at the MIT Symposium, an FE editor discovered this: There is a general feeling that most frozen food packers tend to forget their products as soon as they leave the plant.

We know from personal contacts that technologists and executives of leading frozen food packers do not "tend to forget their products as soon as they leave the plant." They have tried to educate people in distribution channels. But obviously the education has not "stuck." Nor has this education been sufficiently widespread.

The overall situation adds up to this: Packers must be more effective than they have in the past in eliminating the quality-impairing defects in distribution operations.

Packers will have to take the leadership and supply the "push."

It is evident that a continuing and effective educational program is necessary to combat ignorance. But procedures that will reveal and avoid carelessness are equally important.

As in all quality-improvement programs, an incentive to do good work and a "penalty" for bad practices are indicated. The latter would cause more of the individuals involved to learn proper methods and to practice them.

Some suggest that the present "missionary" men employed by processors could handle the educational job—as well as "police" distribution channels. Others favor wide use of specially trained technicians. Much could be achieved in these areas.

Standard code-dating of all frozen food packages has been advocated—this to permit retailers to spot out-dated products and to reveal too-slow movement through distribution channels.

Then that old idea of a thaw-out indicator on packages continues to be advocated.

There is much opinion, too, that further progress should be made in retail store facilities, such as the development of a multi-tier cabinet design.

"Brainstorming" being popular these days, we toss out these ideas as "suggestion catalysts".

Retail stores should sell frozen foods from completely enclosed dispensing cabinets, to increase capacity, to maintain uniformly low temperature throughout, and to prevent customers from pawing displays. Packages would be mechanically selected and discharged. Labels would be displayed on a sales-promotion panel alongside the dispenser.

A "Seal of Approval" ought to be created by NAFFP, to be promotionally displayed in retail stores that qualify through education, equipment, and performance to handle frozen foods properly.

A thaw device should be put into each case of products by the packer—to tip retailers off to improper transportation or warehousing, and permit them to inform the packer. The latter then would follow through to the source of the trouble.

A recording clock-thermometer might be packed in, say, every 20,000th case to show if and where mishandling occurs. This gadget would be returned to the packer.

One way or another, educate, check, provide incentive, and "penalize." But correct the situation.

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...CELITE FILTRATION provides perfect clarity... assures appetizing appeal

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Thousands of processors are using Celite today for filtering sugar, beer, fruit juices and jellies, cooking and salad oils and many other products. Why not ask one of them about Celite. Better still, get the complete story from Johns-Manville.

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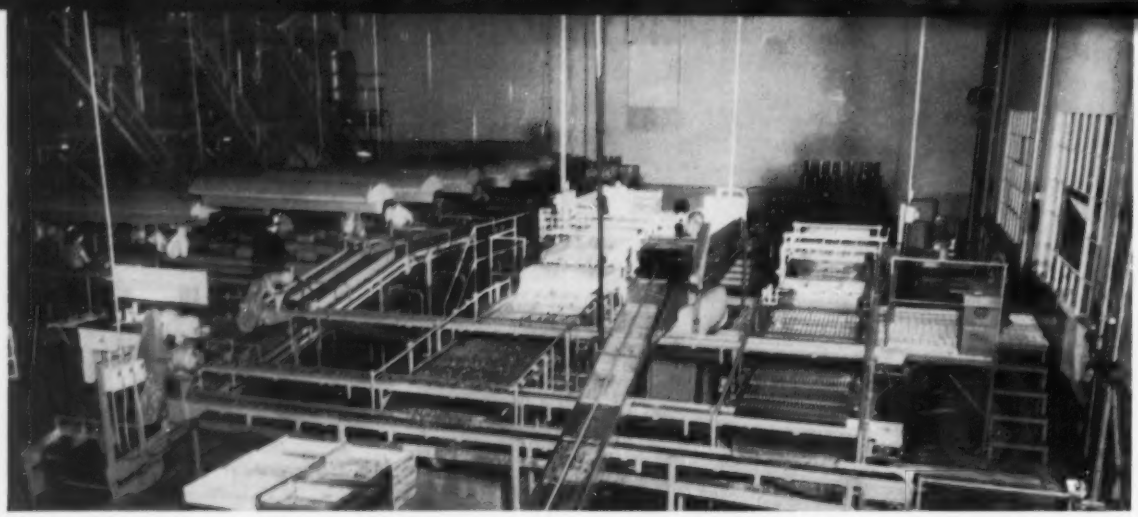
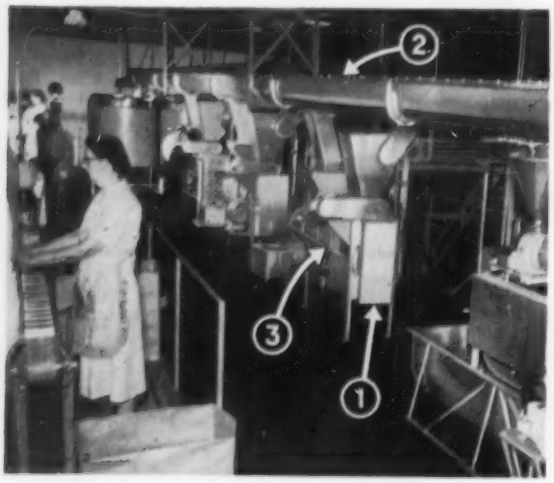
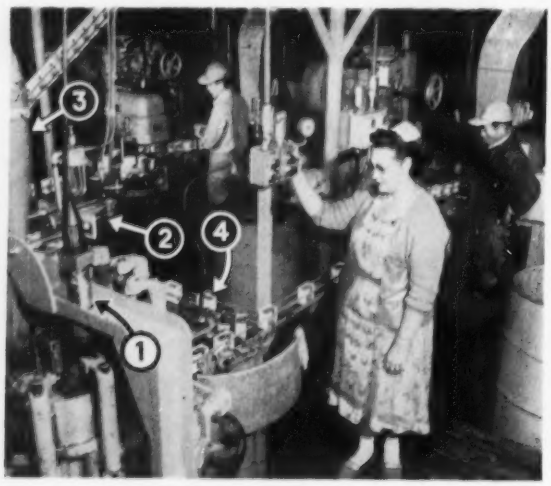


A WASHING AND GRADING area is revealed in this over-all line shot. Three transverse conveyors (bottom) move strawberries from washer-graders to a distribution belt, which divides berries among inspection tables (left). Fruit then travels by elevators to mezzanine floor (top left), and drops into . . .



B . . . SLICER MIXERS—as at (1). Sugar is added from screw conveyor (2), and both sugar and cut berries are then mixed by a ribbon-scroll in cylinder (3). Completed product finally drops through floor to . . .



C . . . FILLING LINES. Here, berry flow is regulated by electro-probes (1) that actuate pneumatic jack (2). Latter opens and closes rubber product tube (3). Vacuum-cup device (4) divides full-carton flow between sealers

Efficient New Fruit-Freezing Process

Not only fits limited space—but ups man-hour production rates, too

TOP-FLIGHT PROCESS ENGINEERING aims at conserving costly plant space, and also necessitates designing an operation with all required efficiencies.

And this is exactly what has been accomplished in the new strawberry line at Stokely-Van Camp, Inc., Santa Clara, Calif.–revealed by our accompanying flow diagram in both plan view and elevation drawings.

The space allotted was formerly used for storage of packaging supplies, and was limited to 100x70 ft. Fortunately, the building is relatively new, with a truss-type roof that requires no supporting columns. This made it possible for the line to be designed in two levels–main floor and mezzanine–with a cat-walk high above, handy to most of the motor fuse disconnects.

The new line has a rated capacity in excess of 10 tons per hr. And although more employees are necessary now, this highly mechanized process has increased man-hour production 25% over that of the previous, smaller operation.

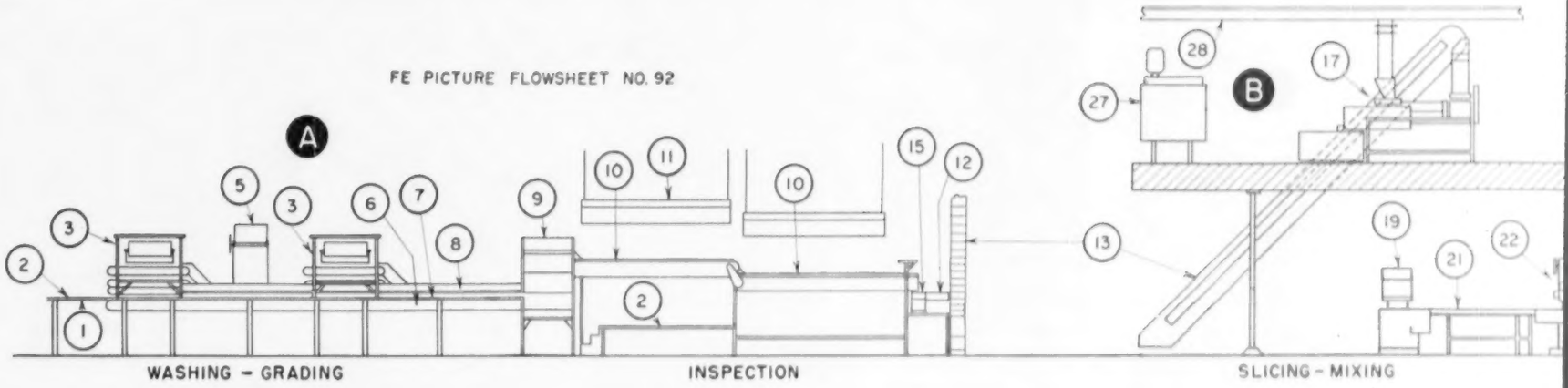
Special Units Guard Quality

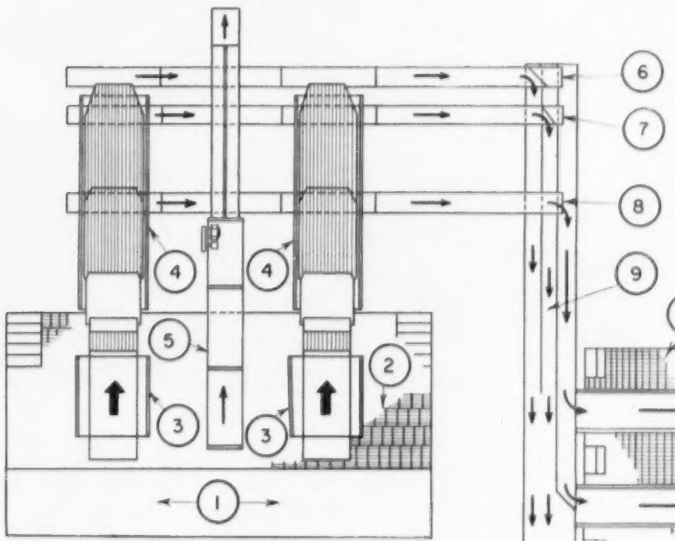
Strawberry preparation, prior to freezing, is largely a materials handling operation. Actually, the only change made in the naturay berry occurs when the product is sliced and mixed with sugar, or packed whole in syrup.

But this is a delicate berry. It needs gentle, rapid handling to retain its fresh-quality characteristics.

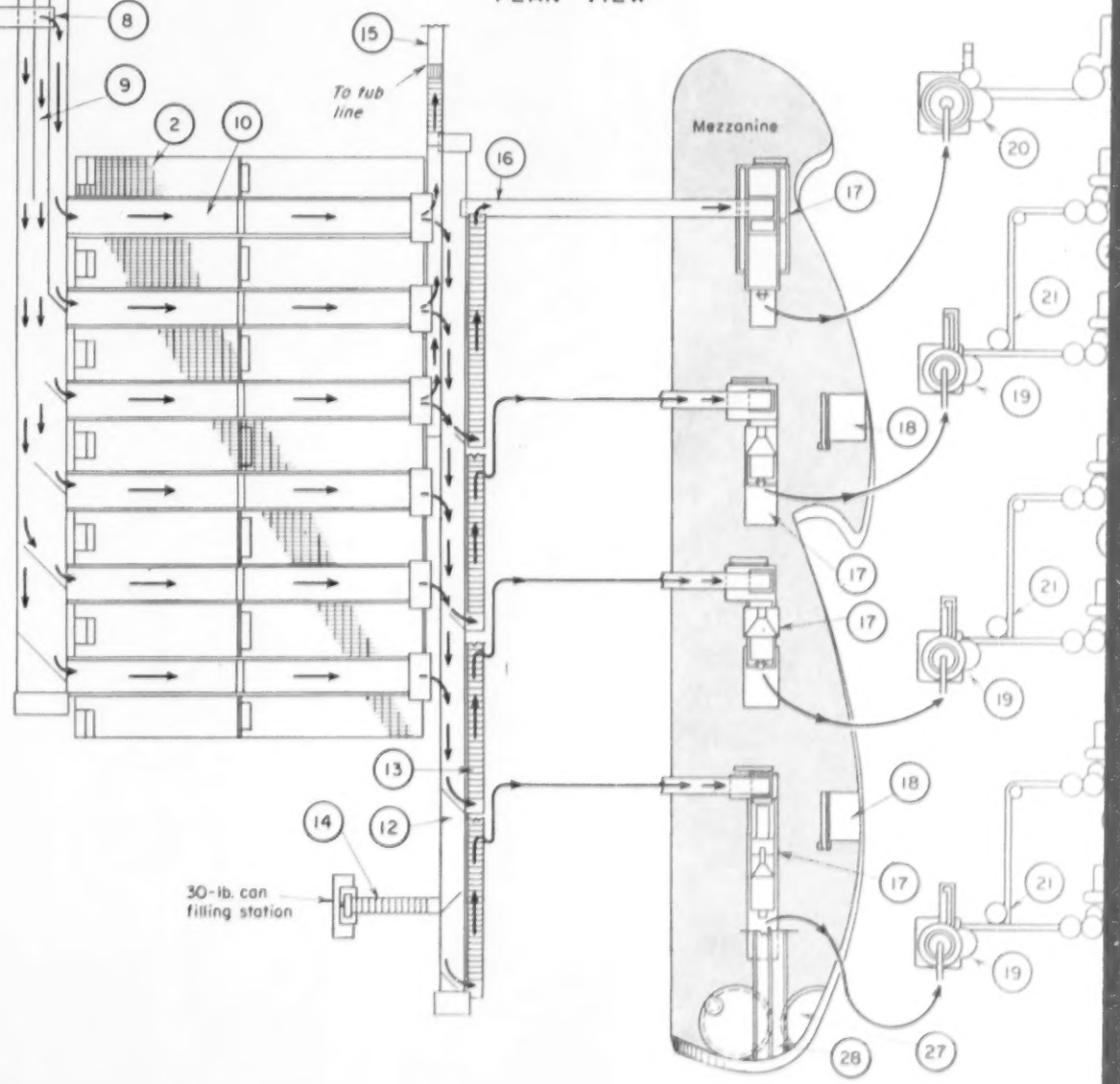
UNFOLD HERE

FE PICTURE FLOWSHEET NO. 92

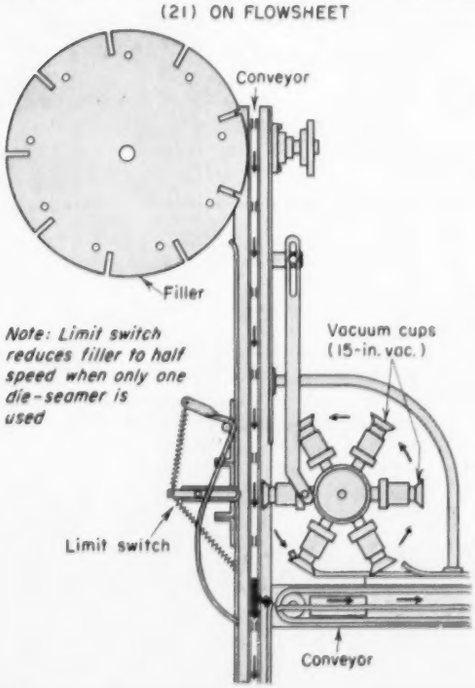




PLAN VIEW

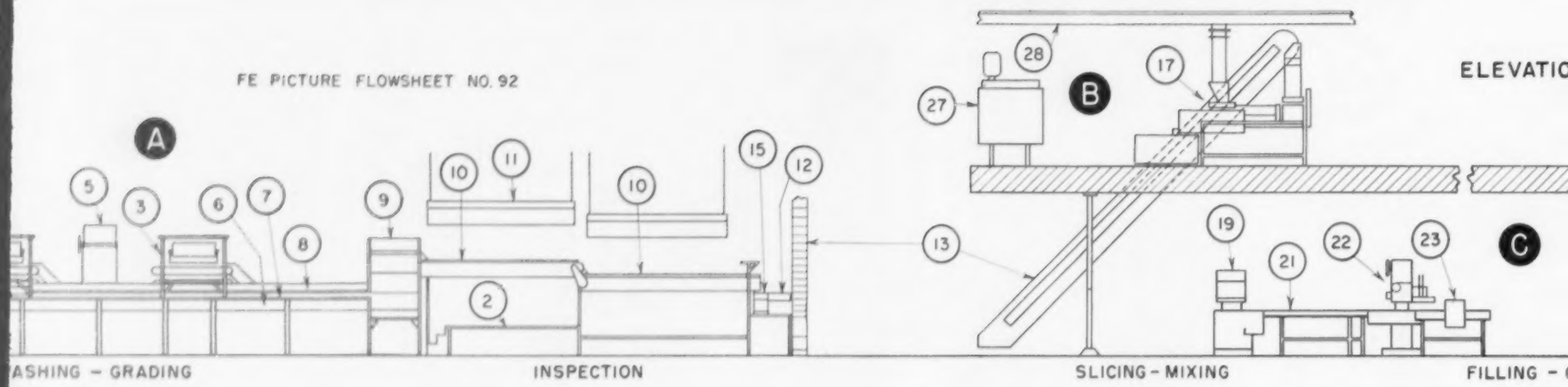


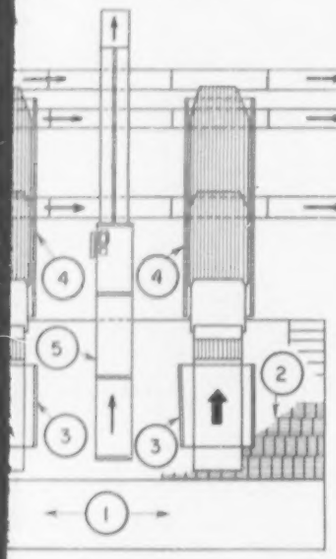
CLOSEUP OF VACUUM CARTON DIVIDER
(21) ON FLOWSHEET



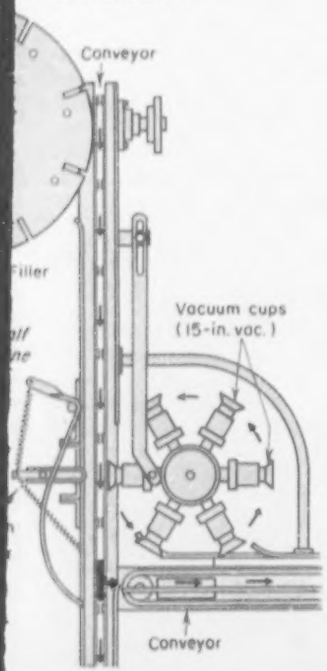
Note: Limit switch reduces filler to half speed when only one die-seamer is used

FE PICTURE FLOWSHEET NO. 92





VACUUM CARTON DIVIDER
21) ON FLOWSHEET



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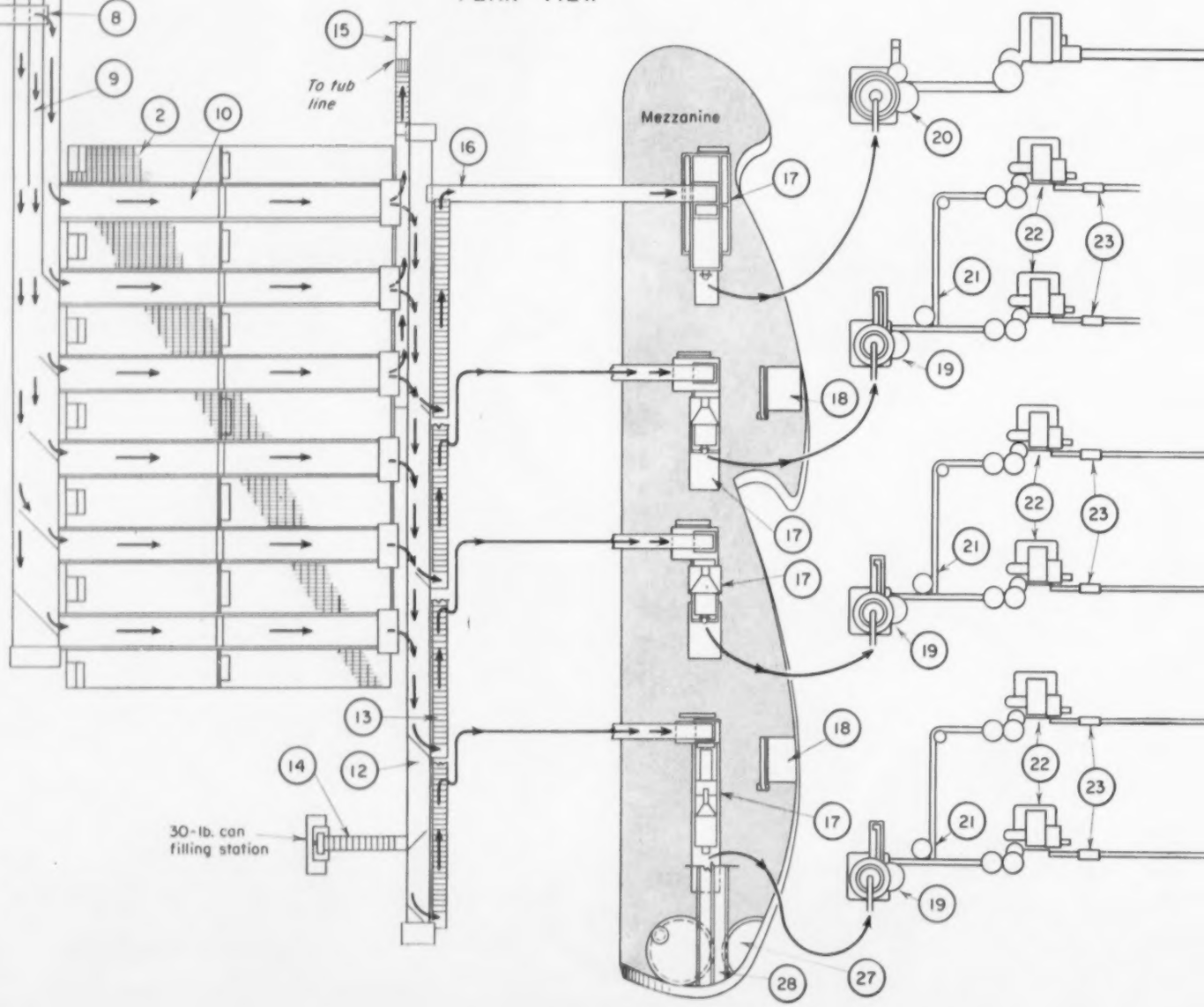

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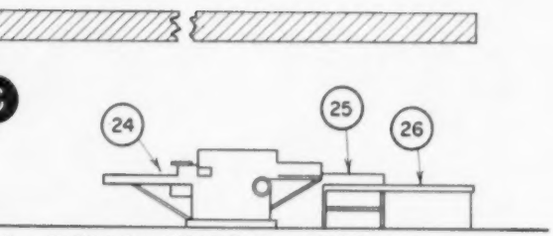
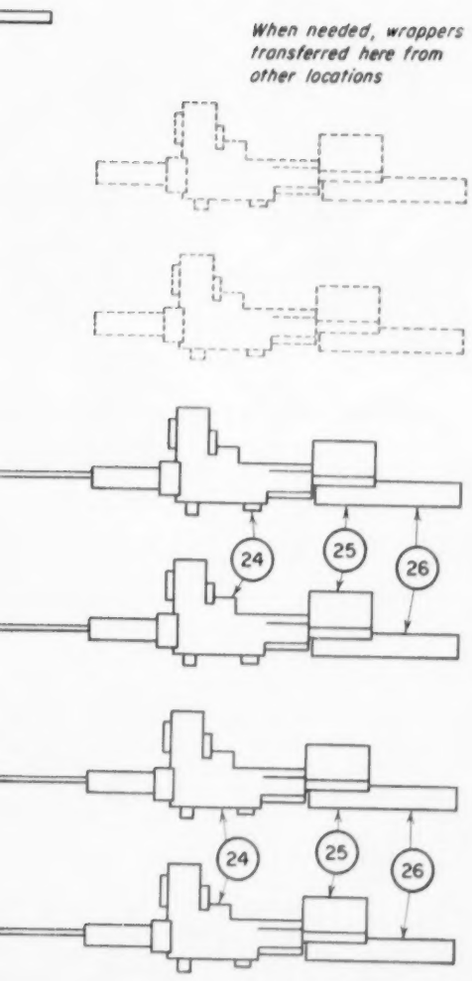


G - CLOSING - WRAPPING - CASING



PROCESS EQUIPMENT LISTED

Item numbers (left column: key to units depicted on accompanying flowsheet

Item Number	Number of Units	Units and Makers	Motors Number	Motors Hp.
1	1	Loading platform, 1/4-in. steel plate	...	...
2	..	Grating, non-slip, galvanized—*A. O. Smith Corp.*	...	...
3	2	Berry washers—*McLaughlan*	2	1
4	2	Berry graders—*McLaughlan*	1 3	1 1/3
5	1	Berry crate washer—*Stokely-Van Camp, Inc.**	1	1/2
6	1	Conveyor for 1 1/4-in. berries—*Fabreeka Prod. Co.*	1	1/2
7	1	Conveyor for 7/8-in. berries—*Fabreeka Prod. Co.*	1	1/2
8	1	Conveyor for 5/8-in. berries—*Fabreeka Prod. Co.*	1	1/2
9	1	Distribution conveyor—*Fabreeka Prod. Co.*	1	1
10	6	Inspection belts—*Fabreeka Prod. Co.*	6	3/4
11	12	Incandescent lights, no-glare—*Pictsweet**	...	...
12	1	Distribution conveyor—*Fabreeka*	1	3/4
13	4	Elevator conveyors, cleated	4	3/4
14	1	Elevator conveyor, cleated	1	3/4
15	1	Elevator conveyor, cleated	1	3/4
16	4	Cross conveyors	4	1/2
17	4	Slicer-mixers—*Pictsweet* (slicers)*	4 4	1 1/2
18	4	Feed tables for metal-end fiber containers	...	...
19	3	Fillers, 12-pocket—*Ayars, Chisholm, Ryder Co.*	3	3
20	1	Filler, rotary—*Stokely-Van Camp, Inc.**	...	...
21	3	Divider and trackage	1	3/4
22	6	Die-seamers—*American Can Co.*	1	5
23	6	Washers	6	1/4
24	4	Wrappers—*Package Mchy. Co.*	1	1
25	4	Case-off table	...	...
26	4	Roller conveyor	...	...
27	4	Sugar-syrup tanks, stainless steel, with agitators	1	1/2
28	2	Screw conveyors for granulated sugar	1	5

* Equipment designers.

Here's how Stokeley engineers filled these specifications in the new line:

Crated berries are palletized and moved to the plant. Here, berries are inspected for grade, weighed, then moved by lift-truck to loading platform—Point (1) on elevation and plan views (all units keyed in equipment list, end of flowsheet).

To eliminate congestion, here, product moves into the plant through one door. After dumping, crates are routed through the washer, then hand-stacked on pallets and moved out another door.

At the elevated washing-grading station, berries are hand-dumped into cushions of water—Point (3). And 60-psi. sprays wash them as they move toward the shaker-graders (4), which then divide berries into three sizes. Each size is moved from these units (on separate conveyors) to six inspection belts (10).

These off-white, no-glare belts are constructed in two elevations. Berries are gently chuted from upper to lower section to turn them over. If inspectors on the upper belt miss seeing and removing poor quality berries, those on the lower belt catch them.

First three inspection belts are arranged so they can discharge to one conveyor, feeding the whole-berry 16-oz. tub line, or pass to cleated elevators that supply four slicer-mixers (on mezzanine). Flow to each of these latter units is controlled by shear gates on a distribution conveyor.

The berry slicers (17) were developed and built by Pictsweet engineers. They consist of two banks of circular knives, rotating toward each other. Berries fall between knives and are sliced, then drop into a hopper that feeds the mixer.

Latter consists of a large horizontal cylinder in which strawberries and sugar are pre-mixed by a scroll. Sugar is fed by a small screw which volumetrically measures a pre-set amount into the berries.

There are two electro-probes located in the slicer hopper. One extends down into the body of the mixer, and automatically stops sugar screw and pre-mix scroll when product level is low. The other, a shorter probe, actuates scroll and sugar screw at high product level.

Sugared, sliced berries are discharged into stainless tubes feeding the carton fillers.

The automatic sugar system (Holly Sugar Co.) has a 70,000-lb. supply tank, located outside the building. In operation, its elevator fills a 2,000-lb. bin. From here, sugar flows by gravity to a 100-lb. automatic, recording scale (Parson's) that dumps into dual screw-conveyors above mixers. One of these feeds sugar to the mixer hoppers, and to tanks in which syrup is made. The hoppers are self-damming and can all be isolated by means of shut-off gates. Syrup tanks are stainless, and are equipped with agitators.

Mezzanine also serves as storage and assembly space for cases and metal-end cartons, which are elevated by fork-truck. Cartons are unpacked, on feed tables (18), then chuted to fillers.

Special Filling Methods

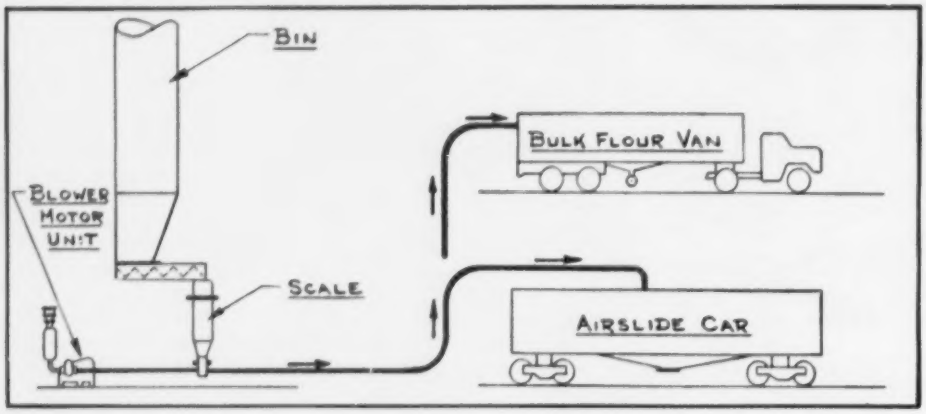
Company engineers made the following two innovations in filling and carton conveying:

1. Automatic control of product flow into each filler bowl (19). Used are three electro-probes and a 40-psi. compressed-air jack. The stainless tubes that feed product from mixers to filler-bowls have sanitary rubber hoses at their discharge points. Each of these runs through a compressed air jack. Longest probe automatically stops filler when product level falls too low. Next longest one retracts the jack, permitting product to flow into the filler-bowl. The shortest probe closes jack, pinching tube and stopping product flow when filler bowl becomes full.

Each filler operates at the rate of 180 cartons/min., and feeds two die-seamers (closers) operating at 90/min.

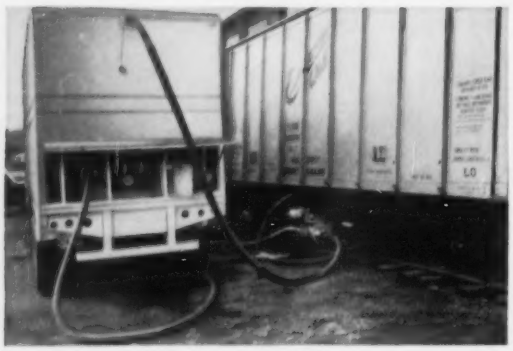
2. A flow divider—Point (20)—consisting of six vacuum cups (arranged like spokes of a wheel) automatically selects every other carton discharged from the filler and routes it to an adjacent die-seamer. The other cartons move straightaway to another in-line closer.

Filled cartons are washed to remove berry juice, then air-dried under a wind-duct, and cased (25). Filled cases move on roller conveyors to glue-sealer, and are stacked on pallets, with each tier separated by spacers. Lift-trucks finally move pallet loads into —35F. freezer tunnels.



Loading flour at mill to either Airslide van or Airslide car.

All the way . . . from mill to bakery . . . with FULLER PNEUMATIC CONVEYING SYSTEMS



Unloading flour with Airslide transfer unit from Airslide car to Airslide bulk-flour van.

Airslide bulk flour van delivery to bakery. Note Fuller blow-through type feeder charging flour from Airslide fluidizing conveyors in bottom of van connected to conveying line to storage bins in bakery.

Now, for the first time, because of the joint facilities of Fuller Company and General American Transportation Corporation, a complete bulk-handling system is made available under one unit responsibility. All the way, from the minute flour leaves the bin in the mill, until it arrives at its destination, it is handled in a completely sanitary manner, free from comtamination.

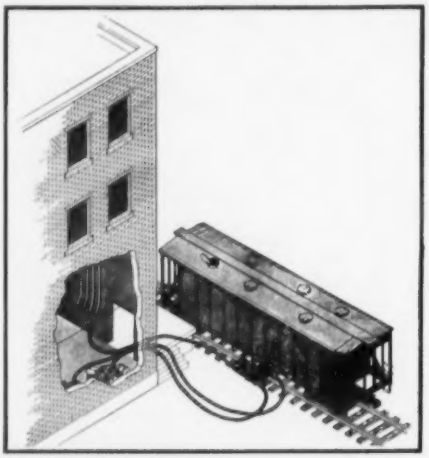
No matter if the bakery is located on a siding or not, Fuller is able to furnish equipment for unloading and delivering to your plant.

In addition to complete Airveyor® car-unloading and in-plant systems of the vacuum or pressure type, or combinations of both, Fuller has designed and built the Fuller Airslide® Portable-Transfer Unit, extending the field of application of both the Airslide bulk car and Airslide bulk flour van. Smaller bakeries, as well as large, can now realize savings possible by handling bulk flour.

For bakeries remote from a railroad siding, Airslide bulk cars can be unloaded with the Airslide Transfer Unit to Airslide bulk flour vans, the van discharging the flour direct to storage bins in the bakery. For the bakery having a siding, the unit can be used to transfer flour directly from Airslide cars to storage in the plant.

The Airslide transfer unit is a unique combination of the F-H Airslide air-activated gravity conveyor and Airveyor pressure type conveying system, wherein the flour is ideally fluidized by the Airslide for charging into the conveying system by the blow-through type of feeder.

Fuller is also in a position to furnish, for appropriate applications, principal system-proved components for in-plant conveying, such as blow-through feeders, rotary air locks, diverting valves, switches, and Airslide conveyors.



Unloading bulk flour with Airslide transfer unit direct from Airslide car to storage bin in bakery. Note blowers installed in bakery furnishing air for conveying and for actuating the Airslide Fluidizing Conveyors.

FULLER COMPANY, 114 Bridge St., Catasauqua, Pa.

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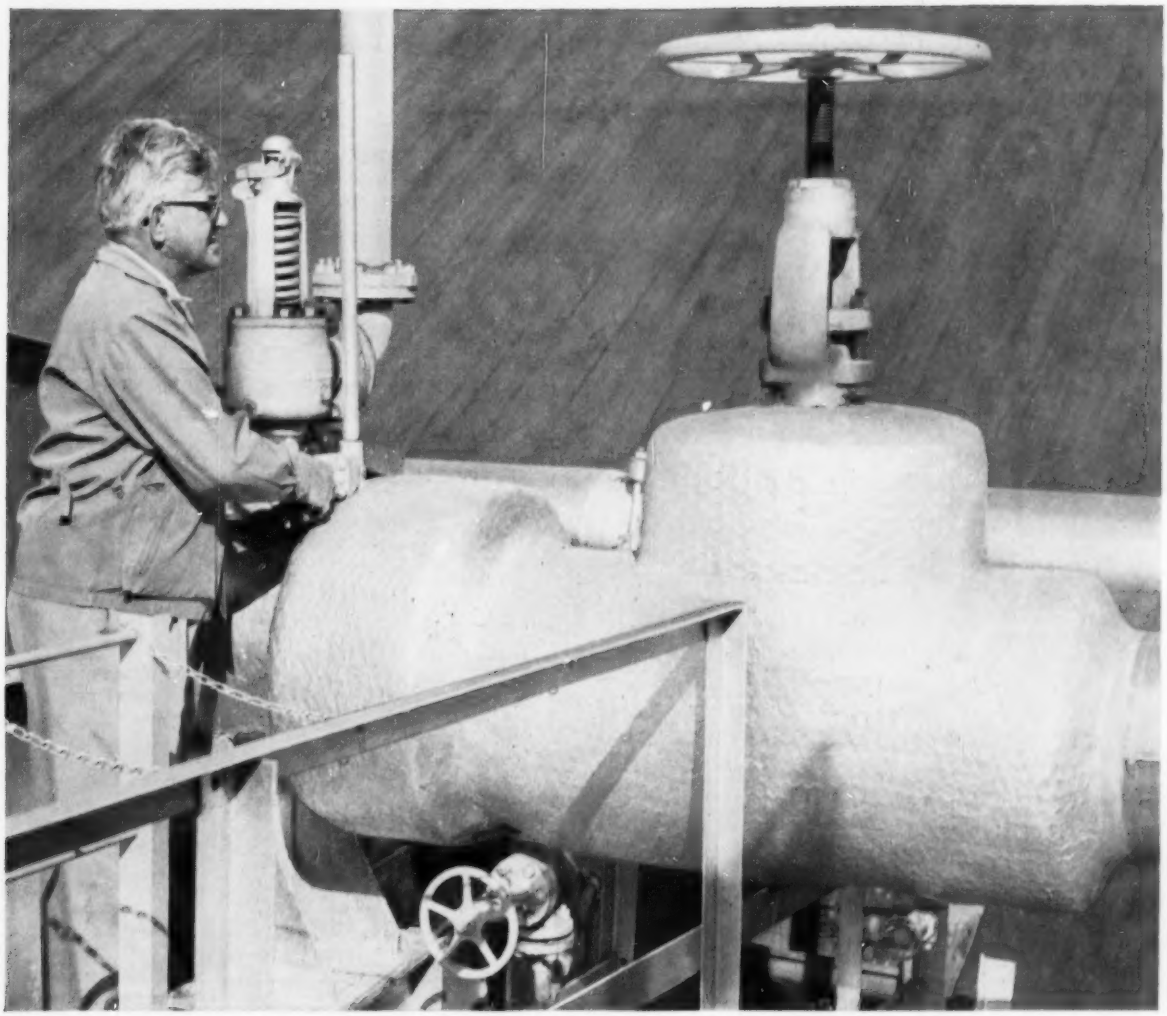


This Crane valve has 20-year cost-free record on 400 psi. steam at 750° F.

Twenty years on this high-temperature steam boiler outlet service with never a wrench on it—that's valve performance in any man's language.

This Crane 8-inch No. 179U cast steel stop-check valve has racked up just such a record at Fort Bend Utilities Co., Sugar Land, Texas, and is working as smoothly today as it did two decades ago.

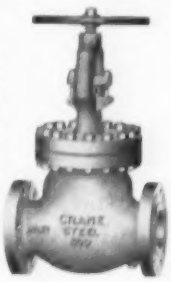
The Fort Bend Utilities plant—a subsidiary of the neighboring Imperial Sugar Co.—finds this Crane stop-check an important aid to boiler efficiency.

Its high-lift disc permits maximum flow-through, with minimum pressure drop under varying load conditions. Seating is instantaneous on back flow.

On manual closure, about once yearly for boiler servicing, the valve has never failed to respond smoothly and seat tightly.

To valve users experienced with Crane quality, this performance record is not so unusual. Thousands of Crane stop-checks throughout industry are giving similarly outstanding service.

The superior materials, the top-flight engineering and construction designed into all Crane valves give them service capacity and durability second to none.



Get these advantages next time you order valves: specify Crane and be *certain* of the valve service you want. Consult your local Crane Representative or write to address below.

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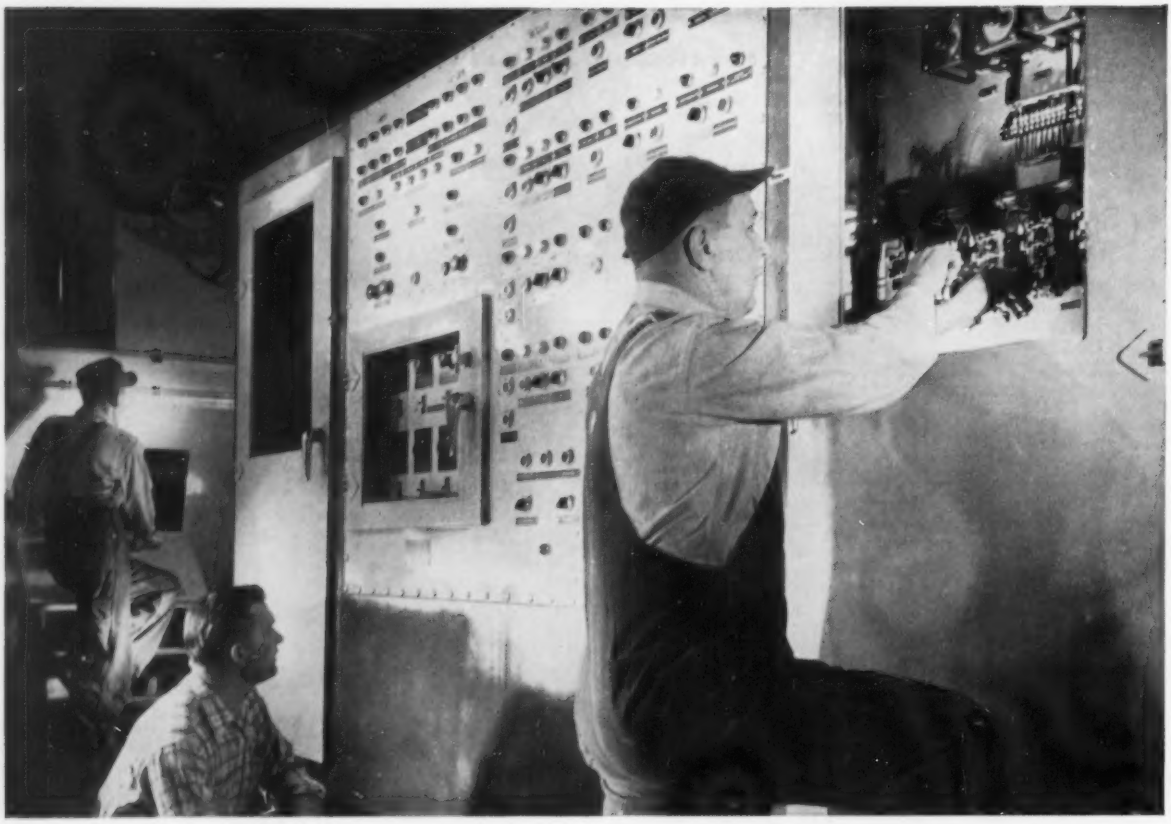

Worked to death... to insure the life of your proportioning system

If there's anything worth its weight in gold in a proportioning system control panel, it's *dependability*. Before a single electrical component was designed into this panel being wired at Richardson Scale Co., its prototype had been literally worked to death in a controlled testing operation. It's survival of the fittest . . . and only the fittest is acceptable. Richardson's reputation as a producer of dependable control panels rests, in the last analysis, on the selection of tested components and on intensive and varied experience in applied electronics.

In addition, Richardson supplies each control panel completely wired and pre-tested, invites the customer to familiarize himself with it *before installation* and takes responsibility for complete system operation. Detailed instructions and diagrams are supplied for each job.

But this is only part of the story. The best of control panels will not pinch-hit for a poor automatic weighing unit, mis-applied materials feeding equipment or improper storage bin design. Richardson know-how in this field embraces 50 years of experience in handling over 400 materials.

When it comes to proportioning, you're in good company when you come to Richardson. Look at some of the others who now have *proportioning by Richardson:*

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3393

THE SHORTAGE OF SCIENTISTS AND ENGINEERS:

What Caused It?

WHY is the United States confronted with a serious shortage of scientists and engineers?

One reason, discussed in earlier editorials in this series, is that the increasingly complex technology needed for national security and for an expanding economy has raised enormously the demand for technically trained people.

But it is clear also that too little has been done to increase the supply of scientists and engineers and to make most effective use of the limited number now available. It is with this second reason for the shortage that this editorial deals.

Too few bright young people have been attracted to careers in the sciences and engineering. Many with technical training have been leaving these professions, with the exodus from teaching being especially alarming. And the technical talent now employed in industry, government and education is, in too many instances, being utilized less effectively than it might be.

Paying for a Miscalculation

A legacy of the depression provides part of the explanation for the current shortage of young people entering scientific and engineering careers. Because of low birthrates in the 1930s, there are now about one million fewer boys and girls of college age than there were in the early 1940s. Not until 1960 will there be as many in the 18-21 age group as in 1945. And from the brightest young people of these ages must come, not only scientists and engineers, but the new members of all the professions needed by our growing economy.

A miscalculation in the late 1940s, when our future needs in various occupations were being gauged, provides another part of the explanation. Occupational counselors and high school students were advised that, because of heavy postwar enrollments in engineering and other technical fields, "it is likely that the shortages of trained men will be alleviated in a few years."*

Instead of being alleviated, however, the shortages became more acute. Job opportunities grew rapidly, while graduating classes dwindled. Fewer than half as many students received degrees in engineering in 1955 as in 1950, the peak postwar year. The trend has been reversed, but graduating classes will not be large enough to narrow the gap for several years.

Lost Talent

Beyond these temporary conditions, there is another explanation for the failure of the number of scientists and engineers to keep pace with our rising needs. This is the staggering loss between high school and college of young people with the talent to be successful in science and engineering. **Last year between 60,000 and 100,000 high school graduates of college ability failed to enroll in college for financial reasons and perhaps an additional 100,000 did not enter college because of lack of interest.**†

Of the most intelligent 20 percent in the group of college age, fewer than half enter college and only about a third graduate from college. Educational authorities estimate that fewer than 2 percent of those in the college age group who are mentally equipped to obtain Ph. D. degrees will actually obtain such degrees.

Another crucial stage is in the high

*U. S. Bureau of Labor Statistics, *Occupational Outlook Handbook* (Bulletin 940), p. 63.

†Charles C. Cole, Jr. (assistant dean, Columbia College, Columbia University), *Higher Education*, November 1955.

schools, where future scientists and engineers receive their first training in science and mathematics. There are serious weaknesses and signs of deterioration in this vital part of our educational system.

One-quarter of all American high schools offer no chemistry or physics. One-quarter offer no geometry. In many of the schools offering science and mathematics courses, the quality of instruction is low. Last year in the New York City school system alone more than 10,000 students were in science classes taught by teachers who were not trained in science.

This is a situation that threatens to become much worse. Between 1950 and 1955 the number of graduating teachers qualified to teach high school mathematics dropped 53 percent and those qualified to teach science dropped 59 percent. Furthermore, only about 60 percent of the graduates certified to teach mathematics or science in 1955 entered teaching as a career.

On the students' side — partly because of inadequate guidance programs — there has been a drift away from science and mathematics courses. The result of low student interest, and poor high school programs, in science and mathematics is virtually to foreclose careers in science and engineering to many bright young people. They miss the necessary basic training. Many who do attempt to obtain college training in these fields are ill-equipped. Engineering school deans report that fully half of their students enter with deficiencies in mathematics.

Misuse of Trained People

Scientific and engineering careers have long had a reputation for low salaries and limited opportunities for advancement. In recent years starting salaries have sky-rocketed and have been accorded wide publicity. But unfortunately there has been much less improvement in the salaries paid experienced engineers and scientists, especially in government and education. This has lowered the morale of experienced men and provided an incentive to desert engineering and research positions for higher paying jobs in sales or management.

Engineers and research scientists complain also that too much of their time now is spent on tasks that draftsmen and technicians could perform. Unfortunately for easy solution of this problem, however, there is an acute shortage of technicians as well. Worse still, there are indications that some companies in industries using large numbers of engineers have gobbled up technical manpower at a faster rate than they can effectively employ these scarce people.

Another drain on the supply of newly-trained scientists and engineers is military service. About 8,000 of this year's 27,000 engineering graduates were in ROTC programs and committed to active duty after graduation. Dr. A. W. Davison, chairman of the Engineering Manpower Commission of the Engineers Joint Council, says that in most cases no attempt is made by the Armed Services to assign these young officers to duties for which their engineering education specifically prepared them. They are not only withheld from industry and education for two years but also are not utilized in defense programs requiring more engineers and research scientists.

Some of the causes for the present shortage of scientists and engineers — bad advice a few years ago and a college age group held down by depression birthrates in the 1930s — are gradually being overcome. But others, such as the deterioration of science and mathematics training in our public schools and the many instances of ineffective utilization of scarce technical talent, enjoy no such prospect of automatic correction. The final editorial in this series will deal with some practical suggestions for meeting these problems.

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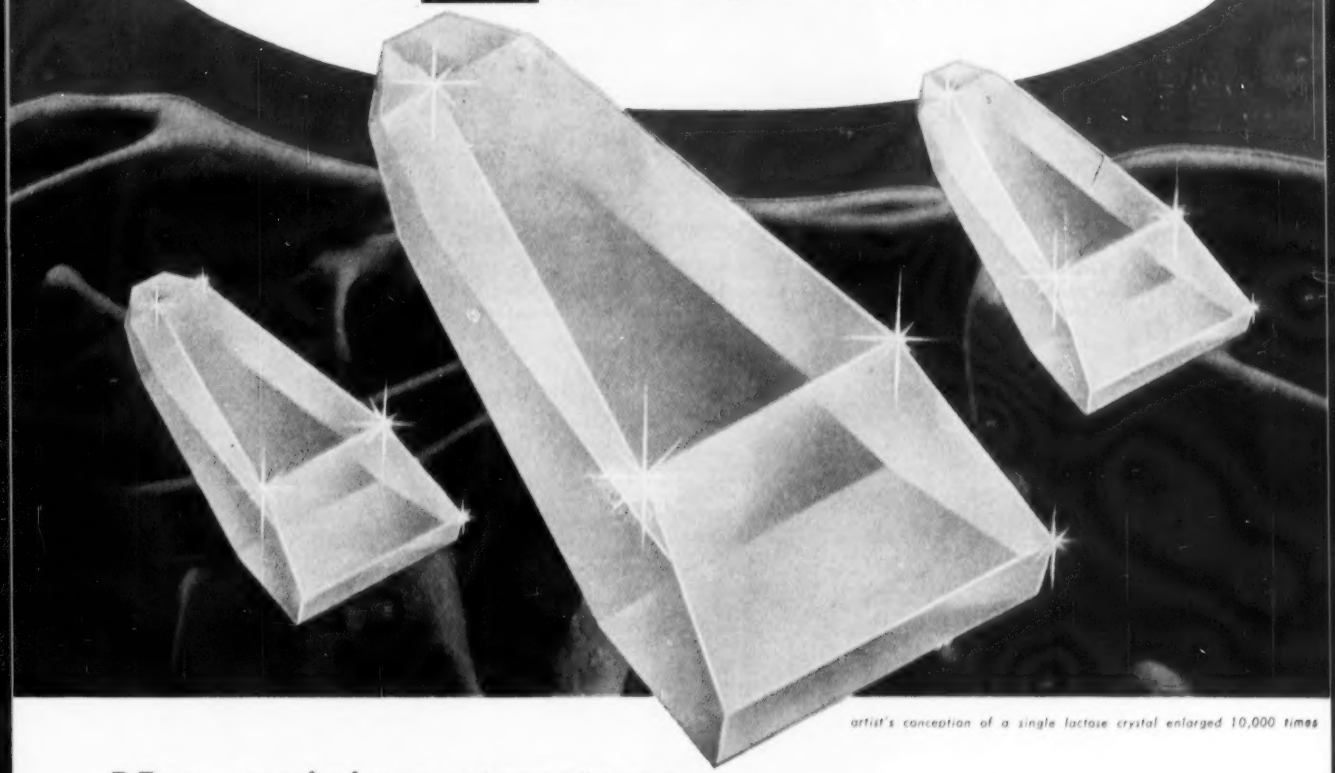

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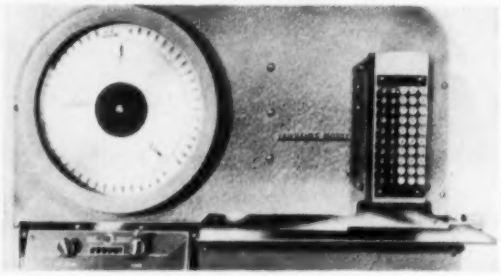
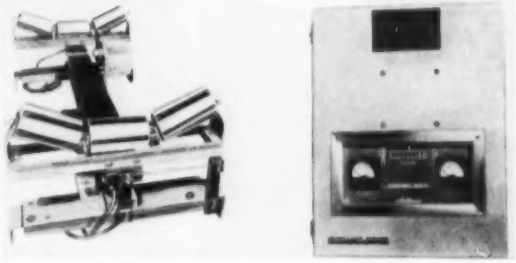
NEW EQUIPMENT & SUPPLIES

These New Electronic Units . . .

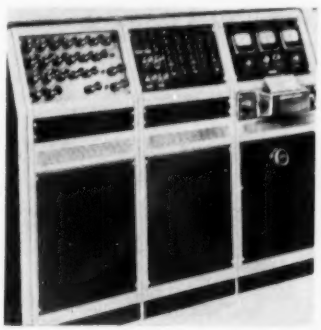


WEIGH-PRINT UNIT (Model CR) has automatic balance detection, hold or memory circuit, automatic ranging, net-gross switch, selective "weigh" and "print" buttons, zero balance knob, and direct-reading tare. (113A)

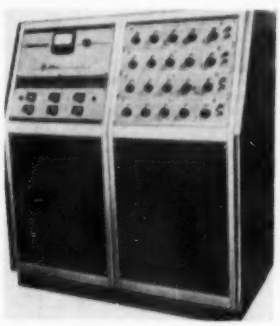


BELT-CONVEYOR SCALE integrates load weight and belt speed, expresses accumulated tonnage on remote register (right). Indicators show percent of capacity at which belt operates and tons per hr. delivered. (113B)

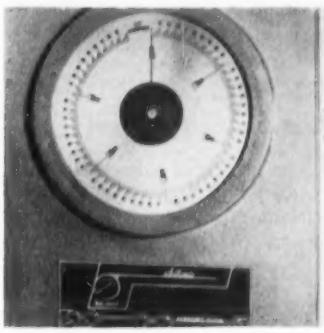
. . . Streamline Weighing, Data Processing



AUTOMATIC BATCH CONTROLLER (EPC) employs pre-punched card to select and weigh out ingredients. Panel controls enable operator to follow batching sequence visually and to regulate it manually. (113C)



SEQUENCE BATCHER (Batchetron) for manual programming: Operator preselects ingredients according to formula, sets required amounts on instrument controls, and pushes "start" button. (113D)



READ-OUT INSTRUMENT (Model CDO) translates weight data from electronic load cells for processing by automatic business machines. Unit simplifies inventory control, billing and accounting. (113E)

ELECTRONIC LOAD CELLS employed in new scales and weigh-batching instruments offer greater accuracy and speed, plus the convenience of remote indication. Units are available in two basic types: First system (Full Electronic) uses multiple load cells to replace conventional levers. Second type (Levetronic) retains the levers, but a load cell is hooked in tension in the steelyard rod. Thus, full-mechanical scales can be converted to electronic weighing and instrumentation. Weight-recording units may be located up to 250 ft. away from scale platform.—*Fairbanks, Morse & Co., 600 S. Michigan, Chicago 5.*

Circle Key Numbers on Reader Service Card

Air Conditioner Controls 25 Variable Zones

A versatile central air-conditioning unit, redesigned for the plant with areas requiring various degrees of heating or refrigeration, provides independent and variable conditioning control for up to 25 zones.

Designated "Multi-Zone Climate Changer," it adjusts for complete air conditioning, cooling only, heating only, cooling and ventilating, heating and ventilating, heating and humidification, or ventilating only.

It eliminates need for reheat coils and their separate controls in ducts leading to individual zones. Improved discharge-damper design, which permits simplified damper grouping and duct installation, allows for job-site flexibility. Furthermore, this unit provides the advantage of using one source of either chilled water or refrigerant.

Available in nine sizes with capacities ranging from 1,700-29,000 cfm.; it can use any type of cooling and heating coil—chilled water, direct-expan-

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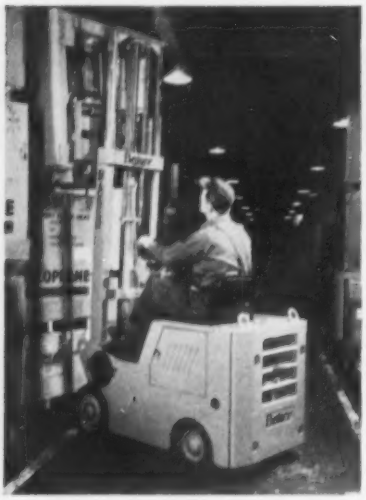
sion refrigerant, steam, or hot water. —*The Trane Co., 206 Cameron Ave., La Crosse, Wis.*

Circle 113F on Reader Service Card



2,000-Lb.-Capacity Unit Is Compact, Efficient

Advance design of this gas-powered fork truck offers top efficiency, operator convenience and safety, and low maintenance. Known as FG-20, it's a 2,000-lb.-capacity unit, latest addition to a line that ranges to 7,000 lb.

With only 11¾ in. from fork face to center line of power axle, truck has less overhang, shorter overall length (102 in.), and greater maneuverability. Turning radius of 61½ in. permits operation in 57-in. minimum intersecting aisles.

Absence of cowl, offset driver position, and recessed seats make for greater operator safety and convenvenient hand and foot controls, unobstructed access for mounting from either side, also automotive-type steering, and self-energizing hydraulic brakes.

For long service life, unit employs an engine and power axle especially designed for industrial truck service. The clutch is contained in a split-bell housing for speedy servicing or relining. And only two bolts need be removed to lift the floor plate.

Operating specifications: Top full-load speed, 8 mph. forward, 7 mph. reverse; total lift, 130 in.; lifting speed with load, 45 fpm., lowering speed, 65 fpm.; and mast tilt, 10 deg. forward or backward.—*Baker-Raulang Co., 1250 W. 80 St., Cleveland 2.*

Circle 114A on Reader Service Card

Bulk-Material Rail Car Offers Pushbutton Unloading

This rail car has built-in conveyors that enable pushbutton unloading of bulk items. Unloading up to 50 ton per hr. is run from electrical panel.

Key to the system are two spiral conveyors which run parallel with the bottom of discharge hoppers. A cross conveyor in the center of the car takes material away from the two spirals and discharges it at central point of car.

The only manual operation is connecting car's discharge outlet at customer's unloading point. Cars are condensation-proof, completely insulated, and airtight, which protects bulk shipments in any weather. Unloading through central discharge eliminates multiple receiving points.—*J. C. Corrigan Co., 41 Norwood St., Boston 22.*

Circle 114B on Reader Service Card

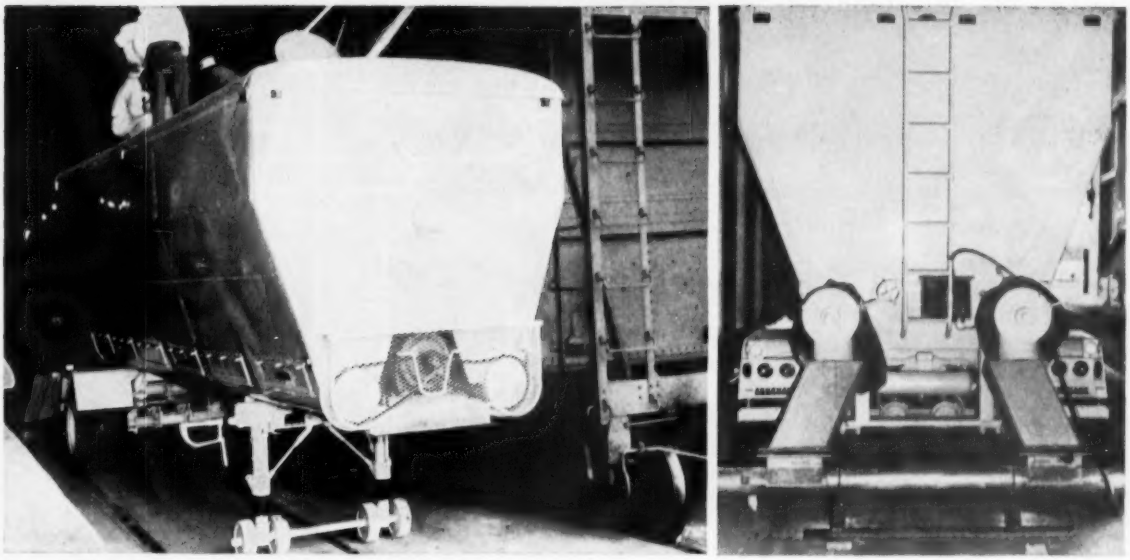
New "Gun-and-Slug" Tool Cuts Tube-Cleaning Time

Scale and slime on condenser-tube interiors may now be efficiently removed by a handy gun-and-slug method, which also cuts labor and shutdown time. The gun weighs 2¾ lb. and is operated either by air or water pressures ranging from 50-200 psi. One man can quickly load an entire bank with cleaning slugs and shoot them through in rapid succession.

Three types of slugs are available: (1) Spool-type slugs, for normal slime removal, designed with a cup at the forward end that expands to wipe the inside of the tube, (2) bullet-shaped units for heavier or thick slime deposits, and (3) scraper-type slugs that cut away scale or mineral deposits.

Latter two types have "jet action" holes in the side wall to admit water or air for flushing away deposits as they are removed.—*Crane Packing Co., Morton Rd., Ill.*

Circle 114C on Reader Service Card



Versatile Bulk-Handling Trailer Doubles as Storage Unit

Dual-purpose design of this insulated bulk-handling trailer offers small and medium-sized plants highly flexible means for transporting and storing a variety of powdered materials.

Called Truck-A-Bin, it serves first as a delivery unit to off-track mills, bakeries, and breweries. In addition, it can be used as a mobile storage unit to eliminate permanent storage bins. Savings of 15-25c. per cwt. are seen through elimination of bags, as well as subsequent labor costs.

In handling flour, for example, trailer is loaded at the mill or from a bulk rail car (left photo), then is hauled by tractor to user's plant. There, it is connected directly to a mechanical or pneumatic flour-handling system (right) for automatic discharge. Or the load can be stored outside the plant for several days without risk of damage.

Capacity of the single-axle model is 25,000 lb., while a tandem-axle unit provides a 32,000-lb. payload. There are three insulated aluminum hatches on the roof for fast loading. Rapid discharge (up to 6,000 lb. per hr.) is accomplished by two screw conveyors that carry material to rear outlets. Latter have special nylon socks and are controlled by a single rotary valve.

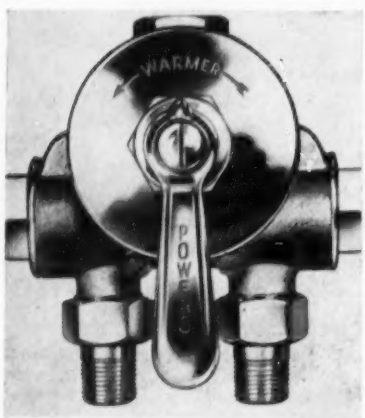
The contour-ground screws are driven through a variable-speed transmission (at the nose of the unit), which is protected by a wire-mesh screen. It is operated from the rear, where all controls are located.

Twin 110-v. electric vibrators are standard equipment. Switches are housed in waterproof receptacles and power for trailer unloading mechanism is 3-phase current, 220v., 60 cycle.

The trailer's interior has a special sanitary lining, and screw conveyors are cleaned through side panels (six on each side, 6x36 in.) that are secured by pawl-type fasteners. When closed, each panel is sealed by closed-cell rubber strips.

While both models are 12 ft. high and 8 ft. wide, length of tandem-axle unit is 32 ft.; of single-axle, 26½ ft. Quantity production will start in January.—*Fruehauf Trailer Co., 10967 Harper Ave., Detroit.*

Circle 115A on Reader Service Card



Mixing Control Supplies Hot Water to 200F.

With this new valve, cold water and steam can automatically be mixed to provide hot water, or to superheat plant hot water for processing.

Called Style D Mixer, unit operates at pressures from 10-100 lb. Turning only one handle regulates discharge temperature between that of the incoming water and 200F., regardless of pressure changes.

A pressure-equalizing valve, consisting of a floating piston, controls pressure of steam and water before they enter the mixing chamber. It also compensates for pressure variations in supply lines caused by use of other outlets. Check valves built into each inlet prevent interchange of steam and

Want More Information?

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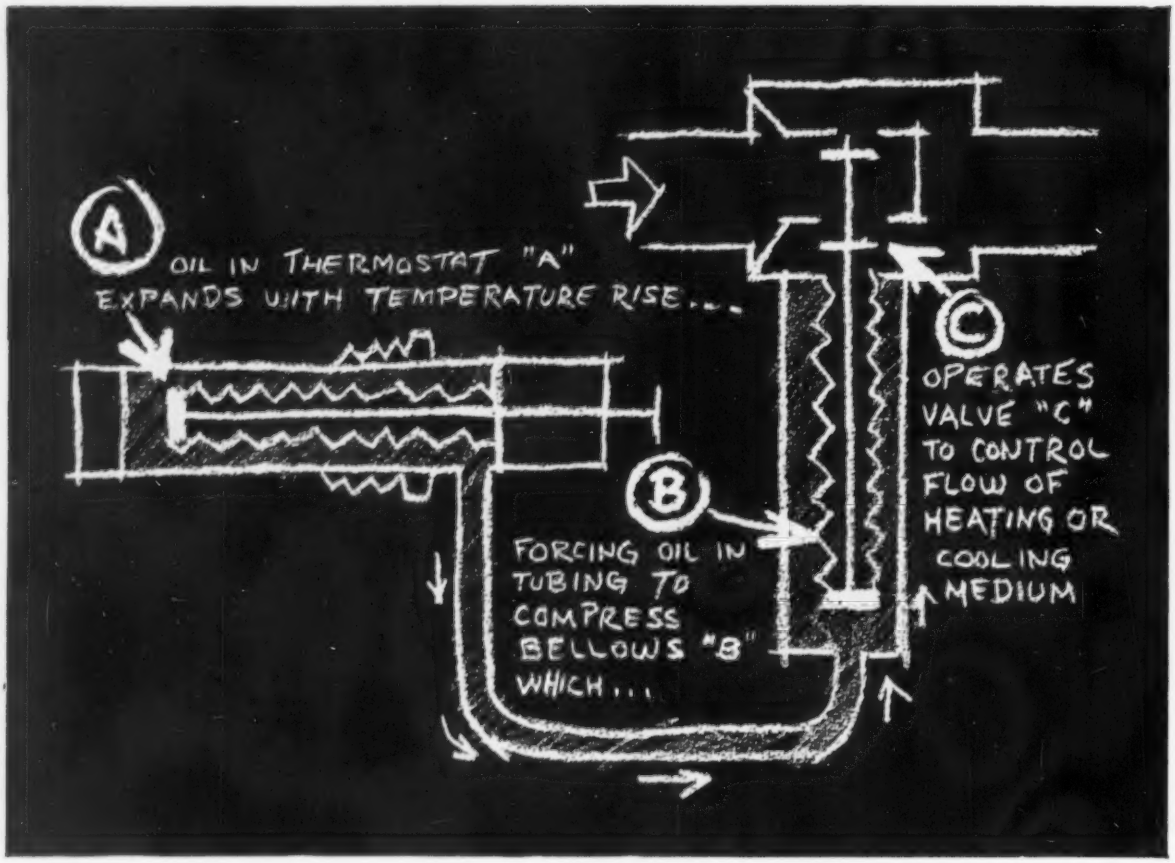
A
OIL IN THERMOSTAT "A" EXPANDS WITH TEMPERATURE RISE...
B
FORCING OIL IN TUBING TO COMPRESS BELLOWS "B" WHICH...
C
OPERATES VALVE "C" TO CONTROL FLOW OF HEATING OR COOLING MEDIUM

Automatic Temperature Control

AS SIMPLE AS A-B-C !

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Cost? Mighty low! For example, the ½" size is yours for about $100. It's good economy to specify AUTOMATIC temperature control for ALL control jobs, not just the big ones.

SARCO COMPANY, INC.

Sarco Company, Inc., Empire State Bldg., New York 1, N. Y.

Please send information on your simple, inexpensive temperature controllers:

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☐ Electric indicating type for use on_____

Name_____

Firm_____

Address_____

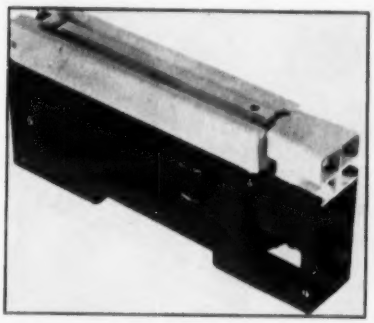
City_____ State_____

21368

cold water when mixer is not in use. The temperature adjustment panel also operates an internal delivery shut-off valve.

Unit is available in ½-in. and ¾-in. sizes.—*Powers Regulator Co., 3434 Oakton St., Skokie, Ill.*

Circle 115B on Reader Service Card



New Psychrometer Offers Accurate Humidity Control

Wherever relative humidity must be closely controlled, this motor-driven portable psychrometer offers advantages of easier close-quarter operation and precise aspiration rate.

Called "Psychron" it is powered by three flashlight batteries. A matched wet-and-dry-bulb thermometer assembly, accurate to ±0.3F., is ventilated at more than 15 fps. by a small fan. Instrument is immune to radiation effects of the sun, and has a built-in illuminator for reading in the dark.

Unit operates in a range of 10-100% R. H., and at temperatures from 10-100 F. Dimensions: 10x4⅞x1⅛ in. Weight: 2¼ lb.—*Friez Instrument Div., Bendix Aviation Corp., Baltimore 4.*

Circle 117A on Reader Service Card

range from fractional up to 20 gpm.

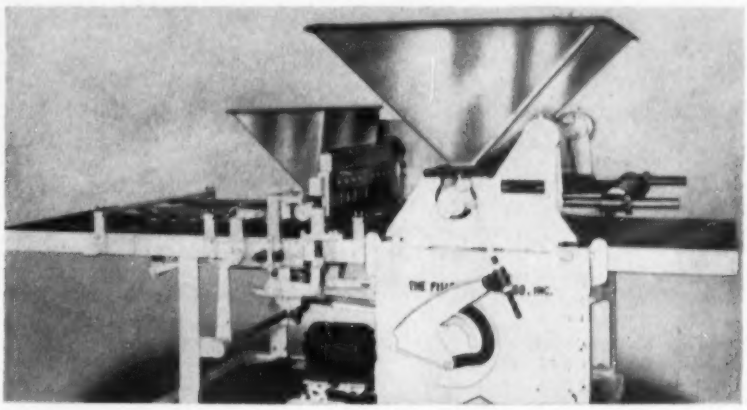
Fluid passes through the unit (Sani-Flex) between the outside of a tasteless and odorless Neoprene liner and the inside of a stainless-steel body block. Trapped between these two parts, it is progressively pushed through the pump by an eccentric shaft assembly. This gentle action avoids churning, foaming, or breakdown of fluid.

Absence of stuffing boxes or shaft seals eliminates product contamination, as well as leakage. Abrasive liquids, such as sugar solutions, are readily handled because of the resiliency of the flexible liner.

There are no internal threads in the pump housing, which is furinshed with sanitary-type fittings. Removal of four wing bolts enables rapid disassembly for cleaning. The only wearing part is the quickly replaceable liner.

Pumps can be furnished driven by electric or air motors.—*Vanton Pump & Equipment Corp., Hillside, N. J.*

Circle 117B on Reader Service Card



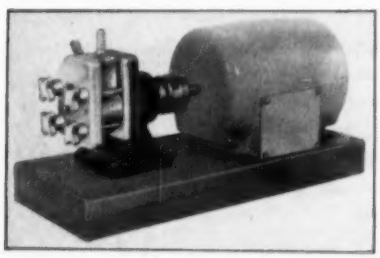
Versatile Batter-Depositing Unit Is Easily Cleaned

Of interest to both large and small bakeries is a versatile piston-type filler for items such as cup cakes, brown bread, date-and-nut bread, corn muffins and French pastry. Moreover, sanitary construction (all product-contact parts of stainless and Monel) facilitates cleaning.

Filling is accurate since unit (Batter Depositing Machine) uses the bottom-up method to eliminate air pockets. Equipped for quick change-over, it handles a wide variety of different size and type pans. Machine has few moving parts, which minimizes maintenance, and is set on casters for easy mobility.

Available in various sizes, all models can be equipped with maker's cup-cake pan greaser.—*Filler Machine Co., 10 Penn Ave., Rockledge, Phila., 11.*

Circle 117C on Reader Service Card



Seal-Less Sanitary Pump Has Unique Action

Design of this sanitary pump—for handling foods, corrosive solutions, and abrasive slurries—isolates fluids from all rotating parts. Capacities

Waste-Disposal Cost Cut By High-Capacity Unit

Where public waste-disposal service is impractical or the cost of hauling by private contractor is prohibitive, this unit offers an economical solution.

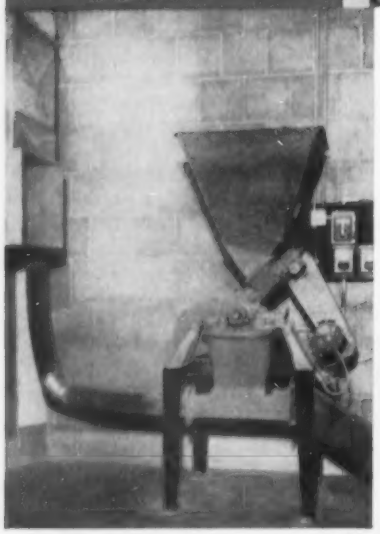
Called M-B Packer Body, its simplified design eliminates heavy hydraulic packing devices, thus allows mounting on lighter weight trucks. Refuse is compacted by a plate that moves from front to rear of the body. Unit is loaded through large side doors that take large cartons and bulky items.

The compressor plate also serves

A smoother operation for a smooth throat-saver

Ducts bringing pulverized material to two MIKRO-COLLECTORS, each with its individual storage bin to hold material for following processing step.

MIKRO-PULVERIZER grinding materials for Pine Bros. Cough Drops at Life Savers Corporation, Port Chester, N. Y.



437

For many years Pine Bros. Cough Drops have been well-known on the counters of many a store throughout the country— —where the attractive display of their various flavors has offered a smoothing, soothing treatment for the person with a tickly throat.

Today, several processing steps of this division of Life Savers Corporation, have likewise been smoothed out. For here, a brand new MIKRO-PULVERIZER has been installed feeding to two likewise new MIKRO-COLLECTORS.

The problem was one of pulverizing, conveying and providing storage of the ground material of the two MIKRO-COLLECTORS. In this way, material is ground at the rate of 2,000 lbs. per hr. and conveyed a distance of 55 feet to the storage area. Conveying and storing is remotely controlled by means of solenoid valves run by one man at a control panel.

This permits a comparatively short grinding period to store up ample material for the day's operation in the mixers, the next processing step. In addition, a much cleaner pulverizing operation has resulted, with the use of considerably reduced manpower.

If smoothing out and improving a ticklish problem in your operation is in order—a call to the MIKRO Laboratory is a simple first step to arrive at the proper answer. Here, your problem is carefully analyzed—the resulting recommendations can be your guide to a smoother, more profitable operation.

SEND FOR your copy of Bulletin 55, describing the workings of the MIKRO Laboratory, and the MIKRO Test Grinding Data Sheet.

Mikro-D

PULVERIZING MACHINERY DIVISION
METALS DISINTEGRATING COMPANY, INC.
97 CHATHAM ROAD **SUMMIT, NEW JERSEY**

PULVERIZING • AIR CONVEYING • DUST COLLECTING EQUIPMENT

as load ejector, forcing refuse out through large rear doors to eliminate tilt-up dumping. High load capacity minimizes number of trips to the dumping area. All components of the packing system are easily accessible for fast maintenance.—*M-B Corp., New Holstein, Wis.*

Circle 117D on Reader Service Card

Solids Filler Operates At 300 Lb./Min.

Powders and granular materials are filled into 1-lb. containers at 300 per min. by this new precision unit. Furthermore, changeover from one can height to another (within a 4¾-7 in. range) takes just a few seconds.

Called Gilda, it fills either metal or fiber cans with an accuracy of a fraction of an ounce. The filler's 40-cu.-ft. bin has a helicoid fluffer that prevents caking or bridging. Integral with the machine, it requires no mechanical support.—*Potter & Johnston Co., Pawtucket, R. I.*

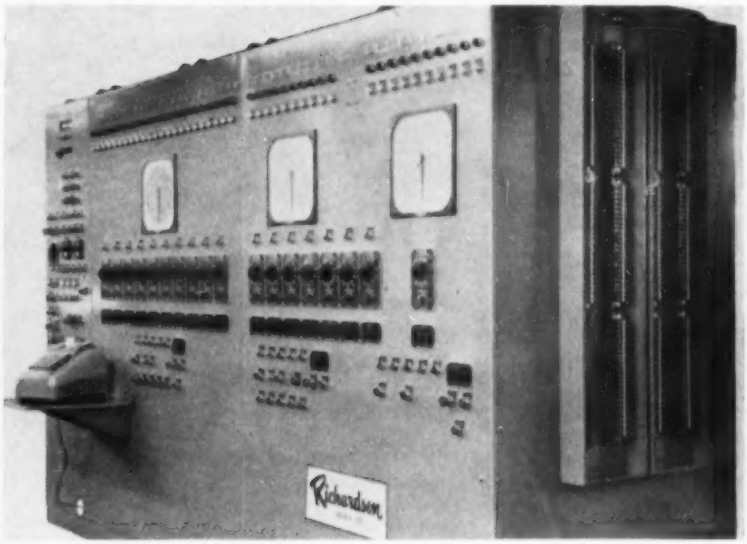
Circle 119A on Reader Service Card

New Anti-Skid Coating Eases Case Handling

Palletizing and stacking of printed shipping cases, which tend to slip because of their slick finish, may be simplified with use of a new anti-skid coating.

Named Resyn 32-3415, it is applied by spraying bottoms of cases as they leave the case sealer. The coating quickly dries to an invisible film.—*National Adhesives, 270 Madison Ave., New York City 16.*

Circle 119B on Reader Service Card



New Proportioning Panel Controls 43 Feeders

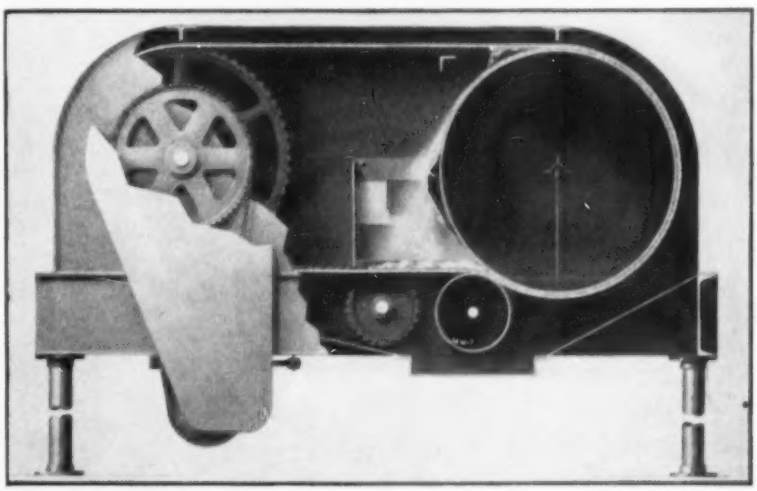
Automatic regulation of 43 solids feeders and recording of formula information are combined in a new electronically interlocked proportioning setup called "Select-O-Weigh."

A pushbutton panel, controlling a 3-scale weighing system, has remote indicators for each scale. The first scale can proportion any 10 ingredients from 23 feeders; the second, any 7 of 10; and the third any 1 of 10. A printing mechanism records formula data for each batch.

Information, recorded by numerical code, includes batch number, date and time of formulation, final cut-off point of each feeder and its identification number, total cumulative weighing of each scale, and total of all three scales. Such data provide a permanent record of all formulations, essential for checking discrepancies.

System is designed for full-automatic or semi-automatic operation. In the former, a formula set up on panel's control dials can be repeated automatically as many times as desired. In the latter, operator sets control dials each time a formula is fed into the system.—*Richardson Scale Co., Van Houten Ave., Clifton, N. J.*

Circle 119C on Reader Service Card



Compact Drum Dryer Has Product Versatility

Said to handle items that formerly could be dried only on tray dryers, this new drum-type unit takes feeds ranging from pasty mixes to granules.

In addition, unit (Drumulator) usually eliminates need for crushing

Plastic double-wall tumblers boost sales of cottage cheese!

Colorful insulated tumblers sample new customers and assure repeat sales!

They're beauties...and they've proved a real profit-maker for dairies in every part of the country! That's because an attractive premium package "samples" new buyers.

"Tropicana Tumblers," a premium package molded of Monsanto's Lustrex styrene plastic, pave the way for getting new cottage cheese customers ... and often getting reorders week after week.

Lustrex styrene plastic gives these tumblers outstanding eye appeal. Their break resistance is remarkable. And the odorless, tasteless, nontoxic properties of Lustrex protect the purity of any food. A double wall, separated by an insulating vacuum, keeps iced drinks cool down to the last swallow.

"Tropicana Tumblers," available in 8 colors, are supplied in 10-oz. size on a guaranteed performance basis by the Mallory-Randall Corp., Brooklyn, N.Y. More than 90 dairies are already using them to send their sales of cottage cheese soaring to profitable new heights.

Monsanto will gladly put you in touch with plastic packaging specialists who will help you work out your own packaging requirements. Write Monsanto Chemical Co., Plastics Division, Room 1168, Springfield 2, Massachusetts.

It pays to package in

LUSTREX*

styrene plastic

MONSANTO

Monsanto also supplies polyethylene and cellulose acetate for packaging.

*LUSTREX: REG. U.S. PAT. OFF.

after drying. It is totally enclosed and easily cleaned.

Machine employs a stainless-steel heated drum (with flanged outer edges) that carries a continuous stainless belt. Product is dried in the space between heated surfaces of drum and belt, and forced across the drum face by continuous introduction of new feed. It contacts the drum for two-thirds of a revolution, is removed, and again fed to the drum.

Recirculation of material agitates and mixes it, which improves moisture release by presenting new feed to the drum surface. Product advances across the drum face a fraction of an inch with each revolution, and drying is complete when material has traversed the width of the drum. It is then plowed off into a discharge chute.

The steam-heated drum is designed for maximum operating pressure of 150 psi., but gas, oil, hot air, or hot water can also be used. Unit does not need a heavy foundation and occupies minimum floor space.—*Jeffrey Mfg. Co., Columbus, Ohio.*

Circle 119D on Reader Service Card

New Panel Coils Provide Efficient Heat Transfer

Curved panel coils that clamp to the outside of a 55-gal. drum or are easily installed in drums and tanks, offer fast and economical heating or cooling.

Units (Thermo-Panel) consist of two sheets of metal with embossing welded to form flow channels. Clamp-type coils are available with hinges for quick opening. Panels are supplied in mild steel or stainless, and standard models. — *Dean Products, Inc., Thermo-Panel Coil Div., 616 Franklin Ave., New York City 38.*

Circle 121A on Reader Service Card

Efficient Vertical Motor Has Compact Design

Now available in the 1-10 hp. range are new vertical solid-shaft motors, more compact than previous models for their horsepower ratings. Units to 30 hp. soon will be available.

Known as Type HV, they are designed to recently adopted NEMA standards and furnished with style "C" or "P" bases. Vertical shaft connection simplifies hookup and unitizes motor with driven unit for precise alignment and quiet operation.

Motor frame, brackets, canopy cap, and outlet box are of shock- and corrosion-resistant cast iron. A heat-seasoning treatment eliminates internal molecular stresses in motor castings to prevent distortion of bearing alignment and warping. It also provides correct air gap between rotor and stator.

Ball bearings are lubricated by a special system that surrounds them with a large volume of fresh grease. Complete lubrication may be accomplished at any time without disassembling the unit. A special asbestic compound protects motor windings for increased service life, and the split-dome conduit box provides easy access to motor leads.—*U. S. Electrical Motors Inc., Box 2058 Terminal Annex, Los Angeles 54, Calif.*

Circle 121B on Reader Service Card

Carton Unloader Handles 1,200 Cans per Min.

When combined with high-capacity can unscramblers, this carton unloader automatically feeds containers to filling lines at speeds up to 1,200 per min., actual rates depending upon unscrambler capacity and can size.

Designed for plants receiving large numbers of cans in reshipper cartons, the system boosts production, while cutting costs for labor, maintenance, and power. It also eliminates the possibility of inadequate supply to canning lines by removing the human element in dumping cans from cartons.

OTHER DEPARTMENTS

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DE LAVAL CENTRIFUGALS INSURE PRODUCT QUALITY...

For years De Laval has been the leader in centrifugal processing. Today, De Laval Centrifugals offer the food industry many exclusive features and advantages... mean better products and better profits. The De Laval Hermetic Separator opened a whole new era in food processing... made it possible for the first time to use a centrifugal refining unit in a closed, continuous flow refining operation. ***Get all the profit-making facts... now!***

FOR EXAMPLE...

Trans World Refining Corp., Jersey City, N. J. states..."We are satisfied in every detail with our De Laval Degumming Operation. The system operates at a capacity of 20,000 lbs. per hour, giving us a very high grade of dried, degummed soybean oil and also yielding a very good grade of soybean gum."

DE LAVAL
SEPARATOR COMPANY

THE DE LAVAL SEPARATOR COMPANY Poughkeepsie, New York • 427 Randolph St., Chicago 6 • DE LAVAL PACIFIC CO. 201 E. Millbrae Ave., Millbrae, Calif.

In operation, cartons filled with empty cans arrive at the conveyor section where two blowers, directing air blasts in opposite directions, start lifting the side flaps. Fixed plows then fully open them. Next, two flat rubberized-canvas transport belts grip one side of the carton to convey it for inverting.

Cans then spill onto unscrambler's receiving belt. After cartons are partially inverted, a rear-carton-opening device folds back the trailing end flap. When empty, cartons are discharged to a conveyor for return to packing stations. — *American Can Co., 100 Park Ave., New York City.*

Circle 121C on Reader Service Card

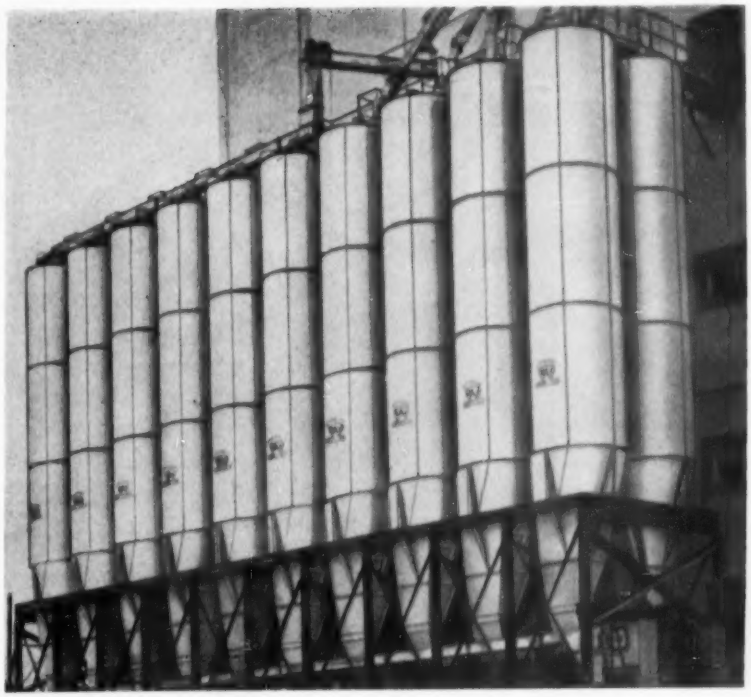
Counts 5-10 Units/Sec. On Conveyor Lines

Where relatively slow counting is required—as on most conveyor lines—this portable unit offers high reliability with low maintenance.

Designated Model F-2, it operates continually at 5 counts per sec., but will count up to 10 objects per sec. in sudden bursts. Using 100-120v., and any of maker's photoheads, counter can be located as far as 100 ft. away without preamplification. This permits placing the photohead in highly confined areas, while the 6-digit totalizer is mounted in a more convenient, readily seen position.

Optional equipment includes special photoheads for installations in which distance between photohead and counter exceeds 100 ft., watertight photoheads, and 115-v., 60-cycle operation.—*Post Machinery Co., Electronic Products Div., Beverly, Mass.*

Circle 123A on Reader Service Card



Bins' Interior Design Keeps Products Free-Flowing

New cable suspension disks, which prevent bridging, and special hopper construction aid material flow in these bulk-storage bins. One side of the hopper is nearly perpendicular to the discharge, while the other is a cone pitched to best accommodate the item being handled.

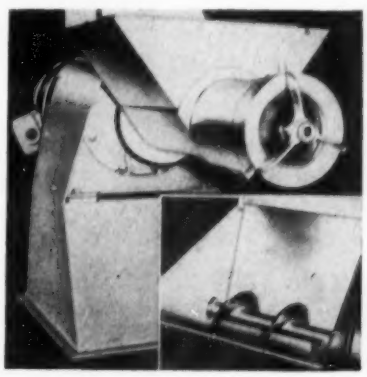
Built and shipped in easily assembled sections, bins require no field riveting or skilled labor for erection. Since they are bolted together, their capacity can be increased simply by adding extra sections. Furthermore, they can be unbolted and moved to new locations.

Units are fireproof and verminproof. Walls cannot flake or contaminate stored material, and flush-joined smooth interiors are free of obstructions.

Bins are available in black iron, galvanized, or stainless steel. Diameters range from 3 to 14 ft., heights to 100 ft. Heavy fins located on the hopper carry the entire load, while reinforced seam construction adds rigidity and strength. Therefore, no support is needed above the bin's cone.

Discharge accessories such as twin-screw feeders, air-lock rotary valves, and rack and pinion gates are also offered.—*The Day Co., 810 Third Ave., N. E., Minneapolis 13.*

Circle 123B on Reader Service Card



High-Capacity Unit Grinds 100-Lb. Meat Blocks

Tough meat-grinding jobs may now be efficiently handled by a new grinder that takes blocks up to 100 lb. Capacity is 15,000 lb. per hr.

Superior performance is attributed to a large hopper throat (21x30 in.) and a special bevel-edged screw that permits grinding of partially frozen and fresh meats, also heavy bone. Time and labor are saved by faster feeding and elimination of clogging.

Unit (Autio) employs a special re-

Extra Strength
in AMPCO* Centrifugal Pumps gives extra dependability in vital brewing operations

. . . prevents pump distortion and costly bearing failures

Look at the picture above and you'll see what we mean. The fittings on these units weigh considerably more than the pumps themselves. But the extra "beef," the high strength-to-weight ratio of Ampco Metal, from which these pumps are built, prevents strains — stops binding distortion that causes costly breakdowns.

But that's only *one* of the advantages you get when you use Ampco Pumps. Since these pumps are built completely from Ampco alloys, beer under pressure, protein, yeast matter—can't impregnate the unit to spoil and taint the flavor of your product.

Ampco Pumps save 25% to 40% on power. They have unusual resistance to erosion and corrosion. And, in addition to high efficiencies, they have characteristics that prevent foaming or degassing of beer.

Ampco Pumps are available in both 1750 and 3500 rpm speeds with capacities to 600 gpm and heads to 300 ft. Mechanical seals can be used with slurries or clear products or you can get flushed seals to inhibit oxygen pickup. Write for latest literature.

AMPCO METAL, INC.
Dept. FE-9, Milwaukee 46, Wis.
West Coast Plant Burbank, California

The Metal without an Equal

*Reg. U. S. Pat. Off.

P-21

Equipment & Supplies

taining ring that holds plate and knife in proper alignment for longer service life and better cuts. Furthermore, product-temperature rise is reduced by use of a low-friction center bearing that also minimizes power consumption.—*Speco, Inc., 3946 Willow Rd., Schiller Park, Ill.*

Circle 123C on Reader Service Card

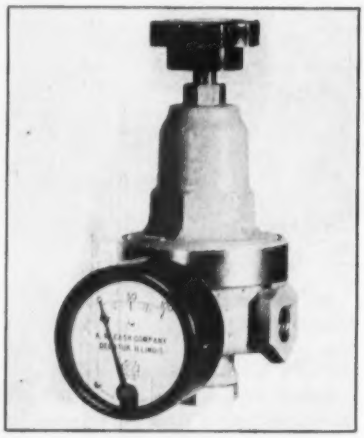
Dual-Purpose Culture Unit Boosts Dairy Q. C.

Testing of dairy items may be simplified with use of a new dual-purpose stainless unit for incubating cultures and conducting methylene-blue tests.

Compact and portable, it is electrically heated and designed to control temperature to 1 deg. Factory settings are 98F. for the methylene-blue test, 71F. for culture incubation. Two thermostats regulate water-bath temperature.

Unit holds 8 quart bottles or 6 one-liter Erlenmeyer flasks for incubation, or 60-140 test tubes for the blue test. —*Marschall Dairy Laboratory, Inc., Madison, Wis.*

Circle 124A on Reader Service Card



Compact Regulating Valve Is Versatile, Accurate

Although measuring only 5⅞ in. high and 2¾ in. across, this pressure-reducing and regulating valve offers accurate control of liquids and gases such as air, water, oil, and steam.

Known as Type 3381, it has been redesigned with increased spring length for greater sensitivity. Also, elimination of cap screws makes for easier servicing. Sizes are ¼ and ⅜ in. with screwed ends (½ in. on special order).

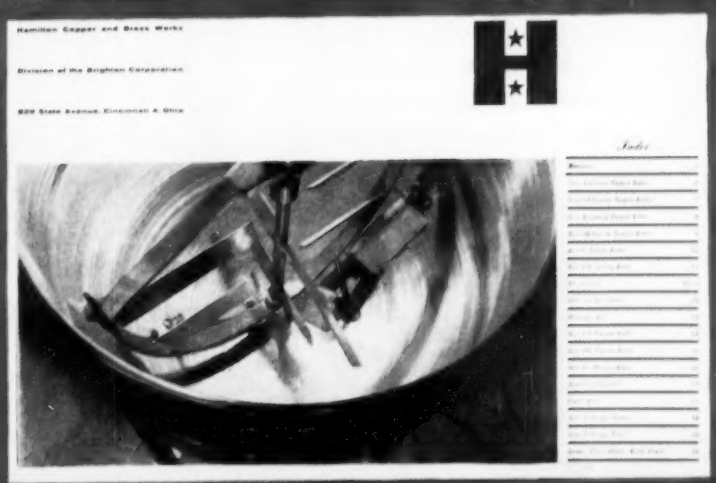
Unit operates at inlet pressures to 400 psi. at 150F., and to 250 psi. at

Announcing –
the new line of
Hamilton fine kettles
with standardized
interchangeable components

This gives you all the advantages of custom design, at no extra cost. Kettles are speedily assembled, to suit your individual needs. Orders are filled in far less than the usual time.

Typical of the new Hamilton line is the SA Mix Cooker, with Heavy Duty Double Motion Agitator and Hydraulic Lift. Extra large kettle design provides fast, even cooking. Streamlined sanitary construction eliminates crevices where trouble-breeding dirt and food particles normally collect.

The new Hamilton Catalog completely documents our extensive line of kettles, tanks, agitators and other modern, efficient cooking equipment. Gives complete information including sizes, capacities and uses. This new 20-page catalog is available on request. Write for your copy today. Call Hamilton—when you need a kettle *quick!*



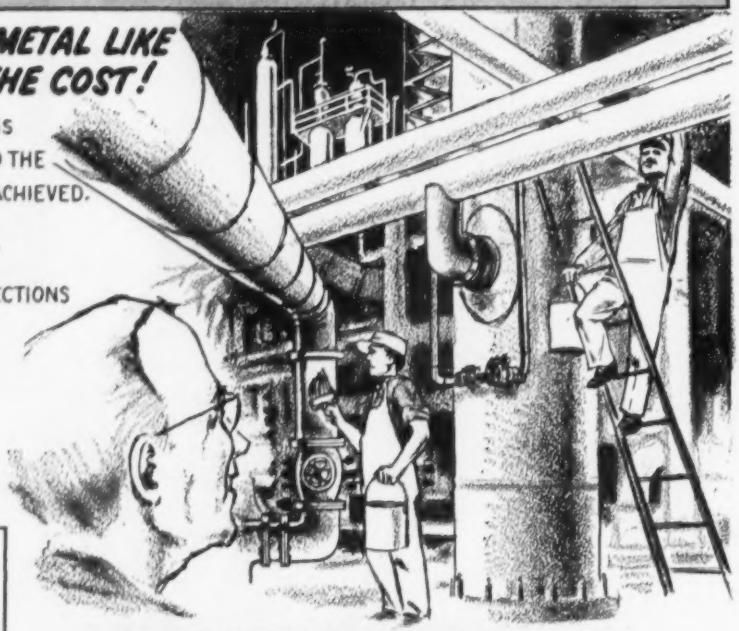
HAMILTON COPPER AND BRASS WORKS

Division of the Brighton Corporation — 824 State Avenue, Cincinnati 4, Ohio

BELIEVE IT OR NOTS IN INDUSTRIAL COATINGS

NEW COATING PROTECTS METAL LIKE HOT SPRAYED ZINC AT ⅓ THE COST!

GIVES AN "ON SITE" APPLIED COATING THAT IS CLOSEST APPROACH TO GALVANIZING AND THE FINEST ANTI-CORROSIVE PRIMER EVER ACHIEVED. FIRST EPOXY ZINC RICH COATING WITH OUTSTANDING ADHESION AND 90% ZINC METAL SURFACE DEPOSIT. HIDES IMPERFECTIONS IN CASTINGS. NOTHING ELSE EQUALS IT. EVEN SCRATCHES TO BARE METAL DO NOT RUST DUE TO CATHODIC ACTION. NEUTRALIZES RUST AND MILLSCALE TRACES. THE NAME IS **EPO-LUX-100** ZINC RICH ZINC DUST PRIMER.



SPECIAL SURFACE MAINTENANCE PROBLEMS ARE STEELCOTE'S SPECIALTY, IF YOU WANT TO REDUCE COSTS, CONSULT STEELCOTE'S ENGINEERING DEPARTMENT F. E.

BOAT BOTTOMS GO FOR YEARS WITHOUT PAINT OR REPAIRS

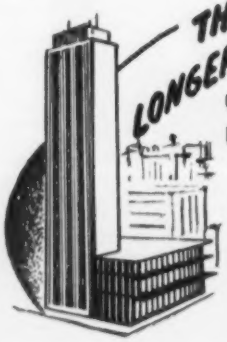
THE NEW **EPO-LUX 100-185** SYSTEM MAKES BOAT BOTTOMS 8 TO 10 TIMES TOUGHER THAN HERETOFORE. WOOD, PLASTIC OR METAL HULLS REQUIRE NO PAINTING OR REPAIRING FOR YEARS. FASTER AND SIMPLER THAN PREVIOUS SYSTEMS.

OFFICES, DISTRIBUTORS IN PRINCIPAL CITIES

FLOOR RESURFACER MAKES WOOD OUTWEAR CONCRETE

WHERE HEAVY TRUCKING, ACIDS, SALT OR ALKALI DESTROY WALLS, WOOD, CONCRETE FLOORS, OR GROUT BETWEEN TILE, **FLOOR-NU** SOLVES THE PROBLEM. MAKES A TIGHT BOND PATCH OR IT CAN BE LAID ⅛" THICK OVER ENTIRE FLOOR. NO SHRINKAGE. READY TO APPLY WITH TROWEL. CAN BE TRUCKED OVER IN 30 MINUTES. NO NEED TO MOVE OR HAUL MATERIALS. HARDER, STRONGER, MORE ADHESIVE THAN CONCRETE. NEW AND ENTIRELY DIFFERENT.

THIOCAULK STICKS TIGHTER, LONGER THAN ANY OTHER TYPE CAULK



THIS CAULK NEVER HARDENS. UNAFFECTED BY TEMPERATURES FROM 65° BELOW ZERO TO 265° ABOVE. HAS 48 TIMES THE ADHESION OF REGULAR CAULK. IDEAL FOR NEW CURTAIN-WALL CONSTRUCTION TO SEAL OUT CLIMATE. DOES A PERMANENT CAULKING JOB IN NEW OR OLD BUILDINGS WITH CONSEQUENT REDUCTION IN COST.

THERE ARE MORE THAN 100 PRODUCTS MADE BY

Steelcote

3418 Gratiot St., St. Louis 3, Mo.

400F. Fire spring ranges are available from 5-300 psi. delivery pressure. Body and trim are bronze, seat and diaphragm are of bronze or composition.

Valve can be supplied with a pressure gage mounted in either of the two outlet connections. Adjusting screws come with square head, plastic knob, or wing nut.—*A. W. Cash Co., P. O. Box 551, Decatur, Ill.*

Circle 124B on Reader Service Card

Unit Develops High Suction For Wet or Dry Pickup

Powered for high suction, this heavy-duty vacuum cleaner is designed for tough wet or dry pickup jobs.

With this unit (Model 115), any number of drums can be used for wet or dry pickup, and changeover is rapid. For sump cleaning or flood control, original drum is equipped with a dump valve for easy emptying.

The filter bag may be cleaned while machine is running or before tank is empty, and an automatic water shutoff cuts the suction when liquid reaches proper height. Unit is furnished with three motor sizes—1½, 2 and 3 hp. Explosion-proof motors are also available.—*American Cleaning Equipment Corp., 2029 S. Halsted St., Chicago 8.*

Circle 127A on Reader Service Card

Plants' Floors Protected By Resistant Topping

Severe floor-corrosion problems may be solved with use of a new chemical-resistant floor topping.

Called Chem-Top, it consists of chemically inert aggregate and a catalyst-hardened inorganic plastic binder, which make a smooth mortar to be troweled over new or old concrete, brick, quarry-tile, metal, or wood at

IT TOOK MORE THAN AN EGGSHELL . . .

to settle this coffee-making problem

Time was when smart housewives dropped an eggshell in the pot to keep coffee grounds collected at the bottom. But the advent of modern spray drying methods has produced the "instant" beverage and made the old coffee pot just a memory.

Ducon Cyclone TYPE SD

Today, efficiency engineered Ducon Cyclone Collectors help to assure success for the coffee processor's secret of solubility. This maintenance-free equipment is providing uninterrupted service with a high degree of recovery, plus quality control for all types of spray drying applications. Minimizing particle breakage, the unit not only collects valuable fines but returns them as part of the marketable product. Like all Ducon Collectors, it is a result of the kind of engineering which has made Ducon "the name" in dust control.

There is a Ducon unit for every dust collecting problem. Send today for descriptive literature.

the name in dust control

Canadian Branch: THE DUCON COMPANY of CANADA, Ltd. 275 James Street North, HAMILTON, ONTARIO

THE Ducon COMPANY

147 EAST SECOND STREET, MINEOLA, N.Y. • Sales Representatives in Principal Cities

Designers and Manufacturers of Dust Control Equipment Exclusively

CYCLONES • CENTRIFUGAL WASH COLLECTORS • TUBULAR CLOTH FILTERS • DUST VALVES

Exposes foreign matter and residue! Resists oils, acids, alkalies!

Globe White Neoprene Rubber Belting installed on leading make conveyor.

EXPOSED: Dust, dirt and other accumulations! Product particles that are left behind!

The snowy whiteness of Globe White Neoprene Belting exposes them all to certain detection, enabling immediate elimination with hot water or live steam. *That's sanitation-plus!*

Known as the do-all conveyor belting of the food industry, for which it was specifically developed, Globe White Neoprene Rubber Belting consists of multiple layers of hard-woven, light duck, molded together with highest grade neoprene rubber between the plies and over the entire surface . . . finished with a 3/64" thick, satin-smooth cover on the carrying side and with a friction surface on the pulley side.

The characteristics of this type of construction are unmatched: Exceptional flexibility; high tensile strength; minimum stretch . . . all extremely advantageous in operations where head and tail pulleys are small, and on machines with limited take-up facilities.

Resistant to oil, grease, acids, alkalies — possessing a satiny smoothness that makes no impression whatsoever on the product conveyed, Globe White Neoprene Rubber Belting is today on the "must" list of numerous food processing and handling concerns.

Also available in Black. Ask about Globe White Ruff Top Neoprene Incline Belting, Globe Brown Neoprene Belting, with friction surface on both sides, and Globe Brown Kling-Top Neoprene Belting, with non-slip top for incline and decline.

Write Dept. E for free samples, literature and the name of your local distributor.

GLOBE WOVEN BELTING CO., INC.
1400 CLINTON STREET • BUFFALO 6, NEW YORK
KNOWN FOR QUALITY THE WORLD OVER

Equipment & Supplies

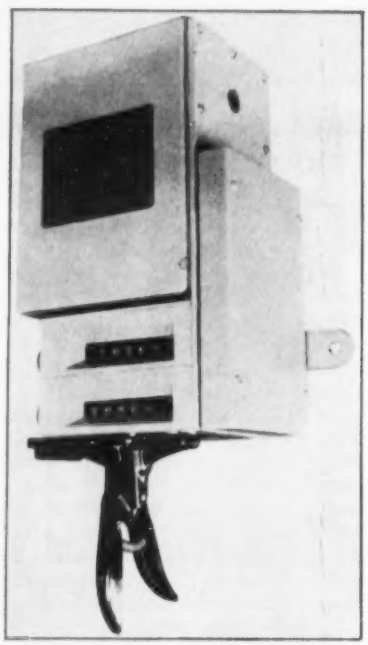
a thickness of ⅛-in. or less. It hardens quickly to give a dense, hard-wearing surface that is easily cleaned.

Test installations in food plants indicate no breakdown under corrosive action by fatty acids, brine, animal and vegetable oils, sugar syrups, sour milk, or strong cleaning caustics. Surfaces to be covered must be thoroughly clean, firm, and scarified. Once floor is prepared, topping can be troweled on and finished to a burnished appearance.

A coarse-aggregate variation of this formulation is offered for use in repairing holes in concrete prior to topping, and for a thick coat where heavy traffic prevails. This too can be applied by trowel, or screeded to requisite thickness and finished to a polished surface.

Materials are available in a variety of colors.—*The Garland Co., 3748 E. 91st St., Cleveland 5.*

Circle 1278 on Reader Service Card



Remote Counter Records 200 Weighings/Min.

This electrical unit has a special clutch drive that permits recording of up to 200 weighings per min. It can be used to tabulate and record weighing processes from any point in the plant, keep production records, and tabulate customers' orders.

Known as Model 31-41, it has two rows of digits, one for a cumulative total and the other for individual

you get bigger pay loads when **COLDMOBILE** cools your trucks

Compactly built, a Coldmobile cooling unit takes up little inside-body space...lets you load more cargo for bigger pay loads and extra profits.

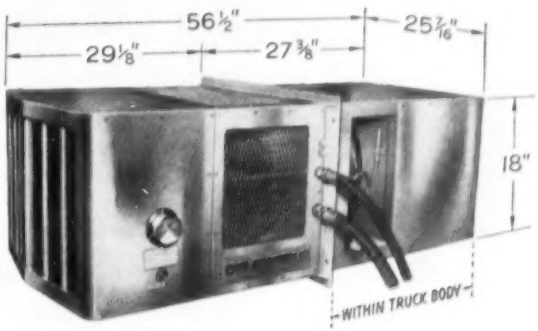
Meats, dairy products, sea food, flowers—in fact, any perishables—get positive cooling protection all the time because Coldmobile maintains proper temperature automatically and defrosts automatically.

Truck powered units eliminate special servicing. Here's real trouble-free operation with nothing to service—no ice bunkers to fill...no batteries or separate engine to maintain. Coldmobile units are truck powered, making refrigeration a by-product of driving. Constant, efficient cooling is provided with little or no effect on truck performance or fuel consumption.

New cooling economy—available in three models. Model "L" (350 lb.) is ideal for over the road operation, operates only when truck engine is running. Model "LE" (550 lb.) adds a convenient plug-in for electric stand-by operation. The Split "LE" (600 lb.) is available for low body trucks.

For complete information, write:

Coldmobile Model "L"—a complete, low-cost package that's easy to install, easy to maintain.



UNARCO

COLDMOBILE DIVISION
UNION ASBESTOS & RUBBER COMPANY
2900 West Vermont Street, Blue Island, Illinois

In JENKINS *Monel-seated Bronze Gates*

THE WEDGE TAKES THE WEAR - *and spares the rings*

Easy replacement of the wedge only — right on the line — restores full efficiency

THE MONEL SEAT RINGS are expanded into the body to assure a positive, leak-proof joint. Exhaustive tests in typical monel-seated gate valve services show that this permanent all-around support of the rings is essential to guard against deforming, loosening, or shifting.

THE RENEWABLE WEDGE (bronze or nickel alloy) has excellent wear resistance, but has a lower degree of hardness than the heat-treated Monel rings, which have optimum resistance to erosion and corrosion as well as abrasion. Thus, wear of the wedge leaves the rings relatively unaffected. When necessary to renew the wedge, you simply remove the valve bonnet, slip the old wedge off the stem, and slip on a new one.

GET PRACTICAL, LOW-COST RENEWABILITY in the valves you choose for the tough, punishing services that require Monel-seated gates. Compare . . . there is nothing simpler, faster, or more economical than Jenkins replaceable wedge design — and you also get the *plus* of Jenkins *extra value* in every other feature. Jenkins Bros., 100 Park Ave., New York 17, New York.

MADE WITH BRONZE OR NICKEL ALLOY WEDGE

The bronze wedge provides lasting economy for most applications. The nickel alloy wedge provides extra resistance where rapid wear and corrosion are factors.

JENKINS BRONZE GATES WITH MONEL SEAT RINGS

200 psi	300 psi
Fig. 270-U, Bronze Wedge	Fig. 280-U, Bronze Wedge
Fig. 270-UN, Nickel Alloy Wedge	Fig. 280-UN, Nickel Alloy Wedge
Fig. 270-UL, Bronze Wedge, U.L. approved for L.P.G. Services	350 psi
	Fig. 280-UX, Bronze Wedge

JENKINS BRONZE GATES INCLUDE 40 DIFFERENT PATTERNS

125 • 150 • 200 • 300 • 350 psi SOLID WEDGE • SPLIT WEDGE
SCREWED • FLANGED • SOLDER END • SOCKET END QUICK OPENING

Call your local Jenkins Valve Distributor for complete information.

JENKINS VALVES

LOOK FOR THE JENKINS DIAMOND

SINCE 1864 TRADE JENKINS MARK

Jenkins Bros.

Equipment & Supplies

weighings. Another model (31-42) records only individual weighings. Units' high recording rate is attributed to speed and accuracy of the clutch arrangement, which prevents "double count".

The counter works on an electromechanical principle. A signal is sent from the user's single-pole, double-throw counter impulse switch located at the scale. This is transformed into mechanical power by a solenoid relay in the counter. When actuated, the relay armature releases the driven member of the clutch, permitting it to engage the driving member.

With clutch engaged, the main shaft, on which a counting cam is mounted, makes a half revolution to move dial numbers. When the second impulse is received, the remaining half revolution is made to register the full count.—*Richardson Scale Co., Van Houten Avenue, Clifton, N. J.*

Circle 128A on Reader Service Card

Light-Duty Bin Vibrator Has Low Noise Level

Quiet operation is an important advantage of a small electric bin vibrator that delivers a 275-lb. impact to keep bulk material flowing in hoppers, bins, chutes, and packers.

Designed for light-duty applications, unit (RC-5) is built on the rotating-eccentric-weight principle, and is said to make no more noise than an electric motor. Vibrator is available in all common a.c. voltages, draws 100w., and weighs 25 lb. It comes with mounting plate for either portable or permanent installation.—*Cleveland Vibrator Co., 2827 Clinton Ave., Cleveland 13.*

Circle 131A on Reader Service Card

New Ingredients

Shelf-Life of Baked Items Upped by Mold Inhibitor

A new liquid mold and rope inhibitor, made of metabolizable food products, offers potent means for combating spoilage in baked goods.

The tasteless and odorless material (Myxnix) is termed especially effective in cream and custard pie fillings, fruit toppings, cookie fillings, cheese cakes, pie crusts, icings, bread, and

Cementable TEFLON... Solves Sticky Problems

on guide rails of conveyors and packaging machines

•

on work surfaces

•

as frictionless hopper and chute linings

•

as non-adhesive coverings for baking and candy making equipment

Cementable TEFLON* is proving a boon to food manufacturers. It is a material so slippery on one side, nothing will adhere to it—not even the stickiest food product—and receptive on the other side to permanent cementing with commercial adhesives to any other material.

On guide rails of conveyors and packaging machines, food products are not damaged, packages are unmarred, no "jam-ups" occur in handling.

On table tops—clean up time is reduced to a minimum and sanitation is greatly improved.

Lining machine hoppers, dry powders and other materials flow freely.

As coverings for cookie flats, candy molds, proving pans, bakery rolls, etc.—sticky products "come clean" without assistance.

Find out about this material that is serving food manufacturers better in so many ways. Ask your Industrial Distributor or write.

UNITED STATES GASKET CO.
Camden 1, New Jersey

NOW AVAILABLE
in inexpensive Tape—5 mil. to 60 mil. thickness in continuous rolls up to 12" wide

1/32" sheets up to 24" x 24", 1/16" sheets up to 48" x 48"

*duPont Trademark.

U S G BELMONT

U.S. GASKET • BELMONT PACKING

Sorbic*

the modern food preservative

protects natural quality...

CONSIDER SORBIC FOR...

CHEESES
CAKES
PICKLES
SALADS
CITRUS PRODUCTS
SIRUPS

- Controls growth of many molds and yeasts.
- Safe at required levels—it is metabolized like fatty acids in foods.
- Contributes no flavor or odor—when properly used.

For further information on how you can protect your food product with Sorbic, write the CARBIDE office nearest you for Technical Bulletin F-6568. Offices in principal cities. In Canada: Carbide Chemicals Company, Division of Union Carbide Canada Limited, Montreal.

*CARBIDE's *refined sorbic acid for use in foods.*

CARBIDE and CARBON CHEMICALS COMPANY
A Division of
Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.

New Ingredients

other yeast-raised goods. It is easily incorporated into batters and fillings, and when properly used, does not adversely affect color, taste, or texture of the finished item.

A selective inhibitor, it suspends growth of harmful organisms only, while permitting free fermentation action of useful yeast. Product is available in gallon jugs, and 30- and 55-gal. drums.—*Mallet & Co., 601 E. General Robinson St., Pittsburgh 12.*

Circle 131B on Reader Service Card

Food Spoilage Curbed By New Antioxidant

Seen increasing the stability of fats and fat-containing foods is a new antioxidant (an alkylated cresol) recently submitted for FDA approval.

Colorless and odorless, the material (AC-3) is proposed for use in lard, also for treating boxes and wrappings of oily foods such as candy and crackers.—*Catalin Corp. of America, 1 Park Ave., New York City.*

Circle 132A on Reader Service Card

Ice-Cream Quality Upped By Improved Emulsifier

Quality of frozen dairy products may be boosted with use of an improved mono- and diglyceride emulsifier.

A white granular material (Atoms 150) containing ¾ monoglyceride and ¼ diglyceride, it offers important advantages with respect to dryness, body, texture, whipping time, and product overrun.

Monoglycerides aid the mixing of fats and water, also produce stiffness. Diglycerides disperse the "monos" in the mix and adapt the emulsifier for uniform performance under varying conditions of formulation and processing.—*Food Industry Div., Atlas Powder Co., Wilmington 99, Del.*

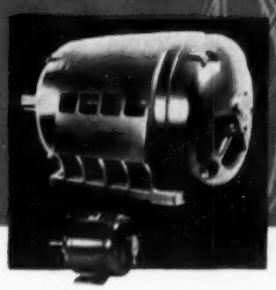
Circle 132B on Reader Service Card

Modified Corn Starch Makes Superior Gel

Physical properties of a new modified corn starch are said to particularly adapt it to food use.

Designated Penford-Gel, it produces smooth, free-flowing cooked pastes that tend to retain these characteris-

Why not build the cart before the horses?



Just tell us here at Master what you want in power drives—and get the utmost in flexibility, compactness and performance. It probably won't be as complicated as the multi-shaft Gearmotor illustrated here, with 14 shafts turning at diverse speeds. But, regardless of what you need, Master can supply the right combination of horsepower, shaft speed and mounting features with whatever Master components are required—all combined in one compact efficient unit. Just ask for information.

Motor Ratings. ⅛ to 400 H.P. All phases, voltages and frequencies.

Motor Types... Squirrel cage, slip ring, synchronous, repulsion-start induction, capacitor, direct current.

Construction .. Open, enclosed, splash-proof, fan-cooled, explosion-proof, special purpose.

Speeds..... Single-speed, multi-speed, and variable speed.

Installation.... Horizontal or vertical, with or without flanges and other features.

Power Drive Features..... Electric brakes (2 types)—5 types of gear reduction up to 432 to 1 ratio. Mechanical and electronic variable speed units—fluid drives—every type of mounting.

THE MASTER ELECTRIC COMPANY, Dayton 1, Ohio

PROTECTION is our business, too

Just as today's tireless doctors, nurses and medical researchers work to protect you and your family from sickness and disease—J&L Steel Containers protect your products by providing dependable packaging that assures safety in transportation and storage. Precise fabrication provides accuracy in all fittings and closures.

J&L drums and pails are chemically cleaned and dried by the JaLizing process. This assures a clean and dry, rust-inhibiting surface and increases the adherence and durability of decoration and interior lining.

Special protective interior linings are available to provide the best possible packaging for your products.

Jal-Coat, J&L's lithographing process, applies your trademark and sales message to the finished container . . . *no side seam touch-up is ever required.*

Plants located at Atlanta, Ga.; Bayonne, N. J.; Cleveland, Ohio; Kansas City, Kansas; Lancaster, Pa.; New Orleans, La.; Philadelphia, Pa.; Port Arthur, Texas; and Toledo, Ohio.

J&L drums and pails are ideal for shipping and storage of food products. Coatings and lacquers applied to clean steel surfaces provide optimum protection.

J&L STEEL

Jones & Laughlin
STEEL CORPORATION · PITTSBURGH

CONTAINER DIVISION
405 LEXINGTON AVE., NEW YORK 17, N. Y.

New Ingredients

tics on cooling or aging. Granules swell in water at 10-15 F. below that of an unmodified starch, and gelatinization is not affected by high sugar concentration.

Other advantages: Resistance to retrogradation, which improves gel clarity; increased water-holding ability, and greater viscosity stability.—*Penick & Ford, Ltd., 420 Lexington Ave., New York City 17.*

Circle 132C on Reader Service Card

Lower-Priced Lemon Oil Added to USP Line

Developed for the processor who requires a slightly lower-cost product, this USP lemon oil is said to be equal in aroma, flavor, and quality to the standard product.

Cost savings result from eliminating part of the dewaxing process normally used in refining the oil. Known as Exchange Brand Oil Lemon, USP, Blue Label 413, it is available in 35 lb. cans and 385 lb. drums.—*Dodge & Olcott, Inc., 180 Varick St., New York City 14.*

Circle 135A on Reader Service Card

Butter Closely Simulated By Versatile Flavoring

This butter-like product offers the processor convenience and economy in flavoring items such as popcorn.

Designated "Richbo", it is said to give the flavor and color properties of real butter. With popcorn, it may be applied in either the wet or dry method.—*Dell Food Specialties Co., Beloit, Wis.*

Circle 135B on Reader Service Card

New Chemicals

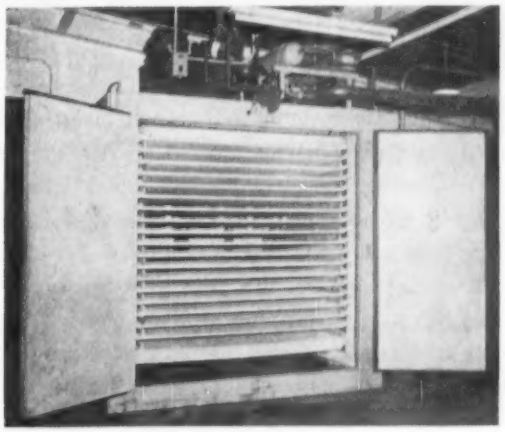
Vinyl Maintenance Coating Cuts Application Labor

Cost of protecting food machinery from rust and corrosion may now be sharply cut by applying a vinyl mastic in a single cross-spray coat. Formerly, a film of the required density could be obtained only by multi-coat application.

Although the material (No. 87) has a high solids content, it is easily sprayed with conventional equipment, producing a 10-mil. coat without sac-

GOING OVER BIG!
Frozen Foods
PROCESSED WITH
AMERIO
DOUBLE CONTACT
PRESSURE PLATE FREEZERS
(U. S. Pat. No. 2,408,069 Canadian Pat. No. 494,746)

AMERIO INSTALLATION ATLANTIC COAST FISHERIES



LEADING FROZEN FOOD PROCESSORS PREFER "Amerios" for the fastest, finest, most economical freezing of Consumer and Institutional Packages. Be it Meat, Fish, Vegetables, Poultry, Fruits or Pre-Cooked Foods, "Amerios" do a better job.

Designed for Ammonia, Brine or Freon Refrigerants.

Send For Illustrated Brochure.

Amerio
Contact Plate Freezers Inc.
Union City, N. J.
"It's the Contacts that Count"

DAY JUMBO MIXERS . . . meet every requirement for maintaining a thorough blend of chocolate products under sanitary conditions at The Nestlé Company, Inc., Fulton, N. Y. For instance: seals may be furnished of sanitary construction requiring no packing, and of such simple design as to permit thorough cleaning in a matter of minutes between batches—(no more black specks working into product from stuffing boxes).

Outboard bearings on all models allow plenty of room for normal cleaning and maintenance. Special agitators available for blending high shortening content products. Heating or cooling jackets, dust covers and many other optional features available. For complete information write for Bulletin 800.

in mixing equipment DAY *means longer life span*

FOUNDED 1887

THE J. H. DAY COMPANY

4932 BEECH ST., NORWOOD, CINCINNATI 12, OHIO
Division of Cleveland Automatic Machine Company

Quality equipment for baking, paint and varnish, printing ink, chemical, rubber, pharmaceutical, cosmetics, paper and pulp, explosives, food, ceramics, candy, soap, sugar and milk products.

Eastern Canada: Brantford Oven & Rock Co., Ltd., Brantford, Ontario
Mexico: T. de la Penoe Hijos, S.A., Nazas 45-A, Mexico 5—D.F.

New Chemicals

rifying chemical and moisture resistance. Especially recommended for covering edges, corners, bolts, and weld equipment, the coating may be cleaned and sterilized with hot water and detergents.—*Amercoat Corp., 4809 Firestone Blvd., South Gate, Calif.*

Circle 135C on Reader Service Card

High-Gloss Wax Provides Greater Slip Resistance

This water-emulsion floor wax contains a special synthetic resin designed to give a hard, mirror-like finish, plus an agent that offers increased slip resistance.

Known as Super Westwax, it is easily applied with a mop of lamb's wool applicator, and dries within 20 min. No buffing is necessary. Initial coats cover 1,500-2,000 sq. ft.—*West Disinfecting Co., 42-16 West St., Long Island City 1, N. Y.*

Circle 136A on Reader Service Card

Potent Germicide Added To Latex Wall Paint

Seen boosting sanitation in food plants is a new vinyl-laytex wall paint that incorporates a powerful germacide (APR).

Odorless and non-toxic, the reagent kills microorganisms on contact and is effective for at least two years. The paint, called Satin-X with APR, is available in a wide variety of colors. It is washable and easily applied.—*Jones-Blair Paint Co., 6969 Denton Dr., Dallas, Tex.*

Circle 136B on Reade Service Card

Concentrated Insecticide Offers Effective Control

Containing pyrethrins and piperonyl butoxide, this non-toxic concentrated insecticide may be used anywhere in the plant for low-cost insect control.

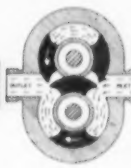
Designated Insekil E. C., it is mixed with water to produce a spray that controls a wide range of flying and crawling insects. In addition, it is recommended for use as a grain protectant.

Product is packaged in quart and gallon polyethylene bottles, and a dilution guide is printed on each unit.—*J. I. Holcomb Mfg. Co., Holcomb & Thomas Sts., Indianapolis 7.*

Circle 136C on Reader Service Card

ONLY Waukesha OFFERS ALL 3 IN A PUMP!

1 POSITIVE DISPLACEMENT



...for smooth, even pumping action—no agitation, no pulsation, no areation. Slow speed...positive displacement...no priming.

2 CORROSION-RESISTANT

...manufactured from Waukesha Metal or Stainless Steel—completely corrosion-resistant. Metal will not react chemically with the product or contaminate the flavor.

3 SANITARY

...simple to disassemble, wash, sterilize, and reassemble. The Waukesha O-Ring Seal completely seals out air... completely seals your product in.

...IT PUMPS ANY FOOD PRODUCT IN SOLUTION WITHOUT DAMAGE

This pump does not macerate delicate food products or cause spoilage. Instead it preserves the structure, appearance, and goodness of the food. The secret is the slow speed, positive displacement action. The Waukesha pump handles equally well all kinds of food in solution. It is a versatile pump—can be used for many food pumping jobs.

The Waukesha pump is a sanitary pump. Saves many hours of cleaning time. The secret is the exclusive Waukesha Sanitary O-Ring Seal.

Made from corrosion-resistant metal, the Waukesha pump will not contaminate the food or impair its flavor. A complete line is available for your plant.

Write for Complete Pump Information

WAUKESHA FOUNDRY COMPANY, Dept. 9-A, Waukesha, Wisconsin

Complete Line of Pumps

Sizes—Inlet and outlet ports from 1" to 3" dia.

Capacities—1/10 to 100 gal./min.; 20 lbs. to 60,000 lbs./hr.

Head Pressures—Up to 100 psi.

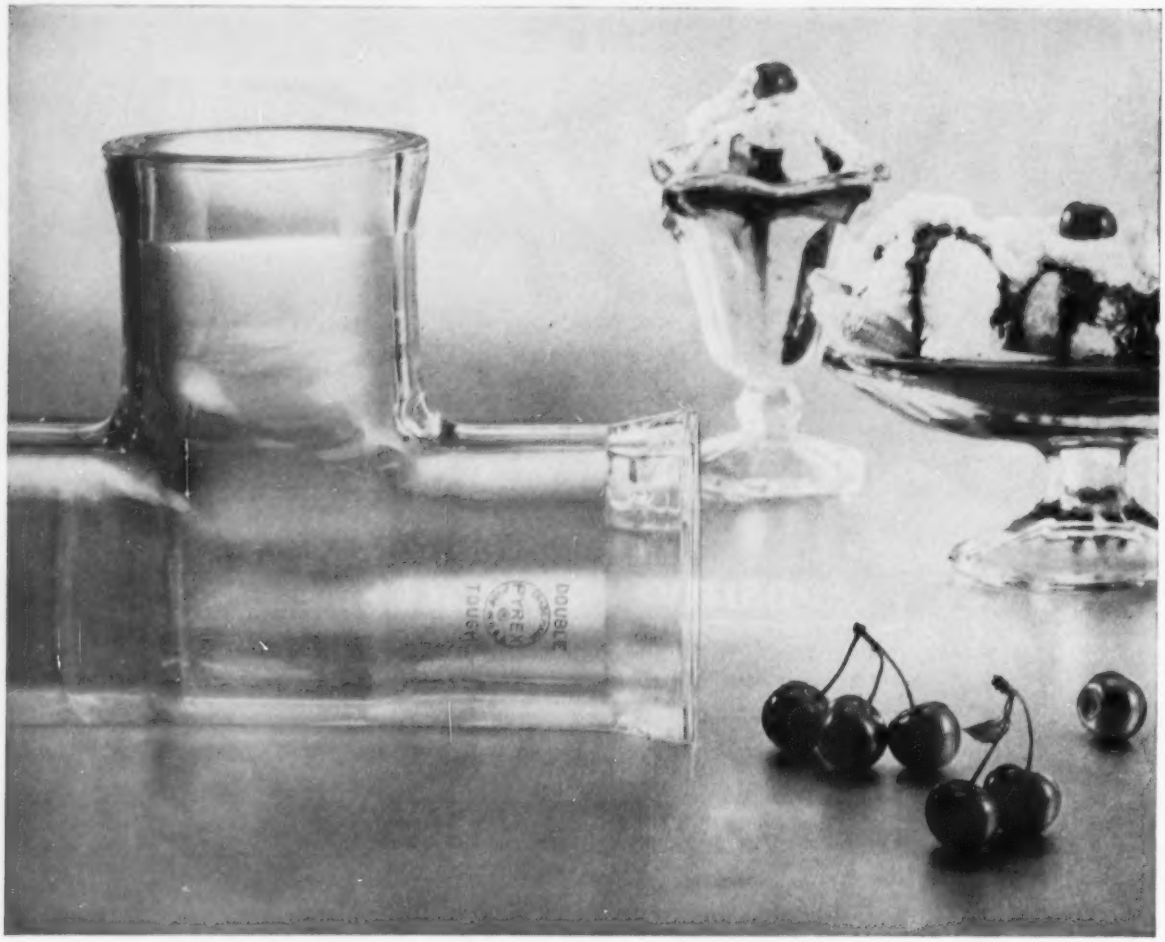
Types—Standard, vented cover. High Boy, V-belt, variable speed, portable.

Typical Products Pumped

Vegetable and meat soups, fricassees, creamed soups, jams, jellies, preserves, pie fillings, baby foods, chocolate, catsup, mayonnaise, syrups, citrus fruit juices, prunes, custards, vinegar and many others.

Waukesha Foundry Company

WAUKESHA—the Forward Look in Pumps. Yesterday, Waukesha Pioneered the Sanitary P.D. Pump. Today, Waukesha Pioneers the Improvements.



HOW TO TOP THESE

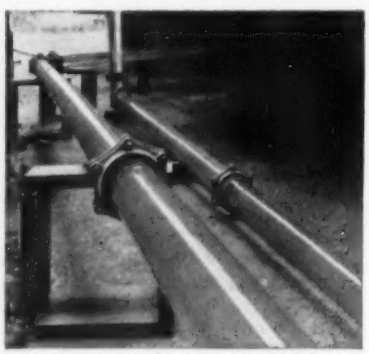
Making a sundae is a simple matter of letting your imagination go as far as your appetite will let you.

Making the toppings that crown these works of art is another matter. Flavors must be authentic, colors faithful. The cherry that becomes the crimson crest of your creation must, for all its handling, be round and firm as on the tree.

Getting the fruit from tree to topping at J. Hungerford Smith is in itself quite a singular process. Rivers of cherries flow safely inside PYREX brand glass pipe. PYREX pipe carries them in a preservative solution from outside storage to processing, through long cellars, around corners. The cherries arrive automatically, in perfect condition and faster than five men could have got them there in barrels.

The Smith people say other lines of PYREX pipe carry syrups and crushed fruit and do it better than anything else they've ever come across. It is easy to clean glass lines thoroughly—and in place. And you can see inside the lines to be sure they're clean.

J. Hungerford Smith uses glass pipe to solve two problems: one, a materials handling problem and second, a purity problem. You might profit from similar uses or your reasons for needing it might include corrosion, or a need to see the product in process. Let us tell you how worthwhile PYREX pipe would be in *your* plant.



Cherries leave outside storage tanks in the pipe at the left. Storage solution returns in right-hand line.

CORNING GLASS WORKS, CORNING, N. Y.

59 CRYSTAL STREET

Corning means research in Glass

Briefs . . .

Automatic Bag Filler handles square-bottom, self-opening paper bags of 1-5 lb. capacities. Output is 1,200-1,900 per hr.—*Arenco Machine Co., 25 W. 43rd St., New York City 36.* (139A)

New Sight Glass is hermetically sealed directly to metal, which eliminates solder or gaskets, the main points of failure.—*Corning Glass Works, Corning, N. Y.* (139B)

Meat Packager compresses and seals boneless cuts (hams, butts, steak logs) in fibrous casings.—*Vac-Tie Fasteners, Inc., 1140 E. Jersey St., Elizabeth 4, N. J.* (139C)

Indicating Temperature Controller offers wide choice of interchangeable elements for multiple applications.—*Fenwal, Inc., Ashland, Mass.* (139D)

Milk-Dispenser Can (5 gal.) is of stainless steel specially welded for strength. Interior surfaces are smoothly finished for easy cleaning.—*John Wood Co., Superior Metalware Div., 509 Front Ave., St. Paul 3, Minn.* (139E)

Polyethylene Exhaust Unit resists corrosive fumes as they are vented to the outside atmosphere. System consists of canopy-type hood plus cylindrical ducts and elbows.—*American Agile Corp., P. O. Box 168, Bedford, Ohio.* (139F)

Sanitary Cabinet for garbage cans eliminates odors, pests, insects, and rodents. Steel unit has a self-sealing lid through which garbage is deposited, and a hinged door from which filled can is removed.—*Neatway Products, Inc., 2845 Harriet Ave., Minneapolis 8.* (139G)

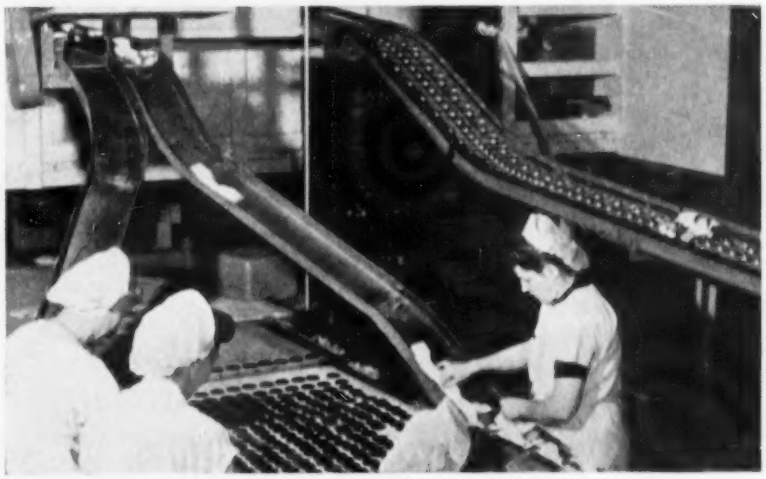
Teflon Sheets or Tape are specially treated for cementing to a variety of surfaces that encounter wear or corrosion.—*Shamban Engineering Co., 11617 W. Jefferson Blvd., Culver City, Calif.* (139H)

Equipment Applications

Versatile Filler Handles Multi-Size Containers

Automatic twin-piston filling of both special and standard containers is speeding production at F. M. Wolfe

Ask Standard : how to cut costs with conveyors



Chutes carry empty trays from makeup machine to packing belts alongside the cookie enrobing line.

Trays are filled with cookies as they move past operators to automatic wrapping and packaging.

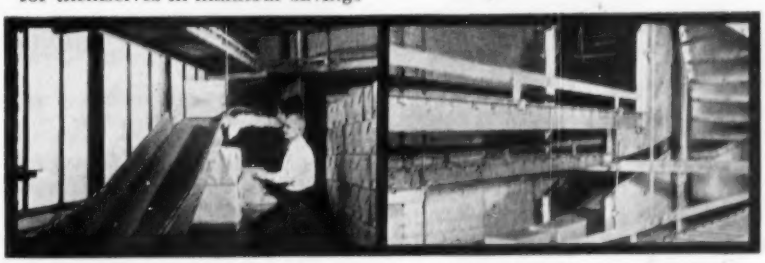
Floor-to-floor conveyors save manhours, space, handling

for famous biscuit and cookie maker

A VARIETY of conveyor equipment makes this system a model of simplicity, efficiency, economy.

It's another example how Standard's experience in conveyor application pays off. At Robert A. Johnston Company, Milwaukee, Wisconsin, Standard Conveyors pay for themselves in manhour savings . . . eliminate most hand trucking . . . cut floor area needed for handling by two-thirds.

STANDARD CONVEYOR COMPANY, General Office: North St. Paul 9 Minn. Sales and Service in Principal Cities. *Canada*: International Equipment Co., Ltd.



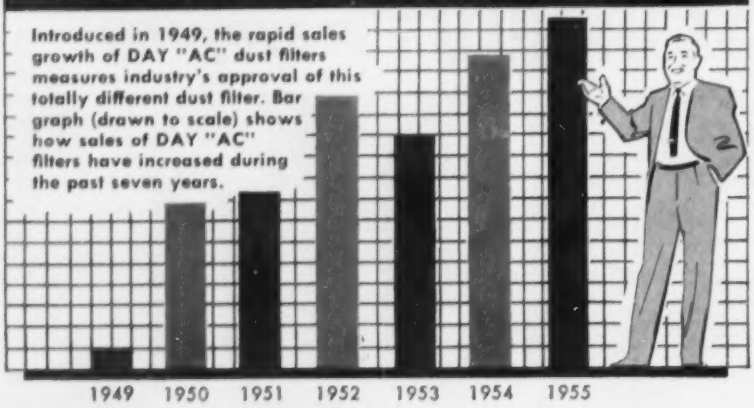
Left: 3-tier power and gravity system carries cases to warehouse. Tape-sealing and coding of cases are done on roller conveyor lines. Right: Multiple spiral chutes lower cased goods from 4th to 1st floor. Speed is controlled by pitch design.

Sales and Service in Principal Cities.

For details, see the Standard Engineer listed in the phone book or write for Bulletin 309. Address Dept. D-9.

DAY REVERSE JET DUST FILTERS

HAVE EARNED INDUSTRY'S ACCEPTANCE


Introduced in 1949, the rapid sales growth of DAY "AC" dust filters measures industry's approval of this totally different dust filter. Bar graph (drawn to scale) shows how sales of DAY "AC" filters have increased during the past seven years.
1949
1950
1951
1952
1953
1954
1955

HERE'S WHY — DAY Reverse Jet Dust Filters HAVE EARNED ACCEPTANCE!

Utilizing the Hersey principle of reverse air cleaning, DAY "AC" dust filters offered industry a needed, long overdue, improved dust filter. This filter has many benefits never before found in any dust filter equipment.

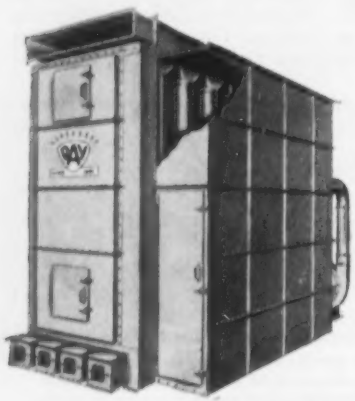
● NEW HIGH EFFICIENCY PERFORMANCE—This filter provides efficiencies measured as high as 99.99+%. This assures cleaner air and higher product recovery.

● NEW FILTER MEDIA—DAY *felted* filter media traps more dust than woven fabric. Felt gives higher efficiency, longer life and has same pressure drop as woven fabric.

● NEW DESIGN FEATURES—The Hersey principle of reverse jet cleaning, DAY self-adjusting blow rings, sanitary square-to-round air inlets, automatic-continuous operation, superior filter media, are just a few of the features introduced by DAY.

● NEW FILTER TUBE CLEANING—Patented self-adjusting blow rings clean the entire filter tube automatically and continuously, to give DAY filters an air handling capacity 5 times higher than ordinary filters.

● NEW LOW INSTALLATION COSTS—Unit sub-assembly saves time and money—up to 75% on filter erection costs.



Licensed by H. J. Hersey, Jr.

The DAY "AC" Reverse Jet Dust Filter is the largest selling filter of its type in the world!

Place the successful operation of your dust control system in our hands. Experienced DAY Application Engineers will survey your plant and supply you with engineered recommendations. With DAY there is no divided responsibility. Our guarantee of satisfaction is backed by 75 years of experience.

Bulletin 559 gives important facts and complete description of the DAY "AC" dust filter. Write toDAY for your copy of this informative 24-page bulletin.

75 YEARS — DAY — SERVING INDUSTRY SINCE 1881

The DAY Company

817 Third Avenue N. E., Minneapolis 13, Minnesota
IN CANADA: P. O. Box 708, Fort William, Ontario
Branch Plants: Buffalo, Fort Worth and Toronto, Ontario
Representatives in Principal Cities

Equipment Applications

Co., Minneapolis processor of dressings and mayonnaise.

The unit (Simplex, F. L. Burt Co., 571 Seventh Ave., San Francisco 3) fills standard pint and quart mayonnaise jars on a rising table, which can be lowered and disconnected for filling of French-dressing bottles. It handles 4 oz. to quart containers at 40-60 per min. All contact parts are of stainless steel, and machine is disassembled for cleaning in about 5 min.

Circle 1391 on Reader Service Card

Reusable Poultry Boxes Cut Shipping Costs

Annual savings of $20,000 through use of aluminum shipping boxes are reported by J. Weingarten, Inc., Houston chicken processor.

They have replaced wooden crates which seldom could be used more than once, since it was difficult to sterilize them. However, metal units (Mid-West Metallic Products, Inc., 2108 Payne Ave., Cleveland 14) are easily sterilized for use. A box holds 25 dressed chickens averaging 2¼ lb. each. Birds are packed in chipped ice, and unit's bottom perforations provide drainage.

Boxes have rims which serve as handles for loading, and permit 50% nesting when empty. Covers are double hinged and lie flat against the sides when units are nested. Dimensions: 12x12x24 in.

Circle 140A on Reader Service Card

No Maintenance Required For Wear-Resistant Valve

Exceptional tightness and wear resistance of a flat-seat bronze globe valve has licked the toughest valve-maintenance problem at E. H. Kahn's Sons, Cincinnati meat packer.

Whereas previous types had to be replaced about every six months, this unit (LQ 600, Lunkenheimer Co., Box 360, Cincinnati 14) has been serving for four years without maintenance. It is installed on a steam line to an ash conveyor. Ashes under boilers are raked in pits, and steam is used to blow them into outdoor bins.

In this service, the valve is opened and closed about a dozen times a day. Here, tightness is critical since any leakage would saturate the ashes with condensed steam, preventing their being blown into the bins.

Circle 140B on Reader Service Card

Synchronous Speed with Induction Simplicity

NEW *Synduction* Motor

MORE

Motor Pioneering by Allis-Chalmers makes constant speed sure and inexpensive

Constant speed from no load to pull-out regardless of load and voltage fluctuations . . . simple across-the-line control . . . fixed speed ratios for a group of synchronized drives . . . high power factor . . . high efficiency — every one of these characteristics is included in the greatest motor design advance in years, the *SYNDUCTION* MOTOR.

Here is a motor that combines the simple dependability of squirrel-cage construction with the constant speed advantage — and none of the complications — of other types of synchronous designs.

Available in all squirrel-cage enclosures and in ratings from ¼ to 40 hp, the *Synduction* motor means new operating economies at lower initial cost in many industries.

Synduction is an Allis-Chalmers trademark.

Have You An Application Requiring:

1. unvarying speed; 2. operation of several motors at fixed speed ratios; 3. adjustable speed with minimum variation at any speed setting? If so, Allis-Chalmers invites your inquiry. Contact your nearby A-C office or write Allis-Chalmers, General Products Division, Milwaukee 1, Wis., for Bulletin 51B8440.

A-5110

ALLIS-CHALMERS

If you're not in the book *you're a man without*

. . . . . a country
. . . . . a state
. . . . . a county
. . . . . a town
. . . . . a party
. . . . . a street
. . . . . a school
. . . . . a *vote*

Look at all the things you can lose, if you're not a registered voter.

If you're not in the book, you lock yourself out of the elections. The polls are closed to you. You can't vote on streets, or schools, councilman or mayor (not to mention congressman, senator or president). You don't even have the right to *complain* about your government and the way things are run!

But more than that, you cut yourself apart from your neighbor next door, your friends at the shop, your fellow members in union or club.

You lose the right to look that boy of yours in the eye when he wants to know if you're doing your part.

And you lose the self-respect that comes from knowing you can walk into the polls on Election Day—the one place in the world where all free men are really equal. Isn't it too much to risk for the little time that registering takes?

Get your name in the book
—and do it now!

Is your name in the book?

Recent Legal Decisions

—Continued from page 79

ceipts issued by the warehousing company.

Counsel for the latter argued that the trustee was not a holder "in due course", because he had acquired the receipts from the CCC, which had loaned money to the plaintiff and taken the receipts for security.

Agreeing with this, the court replied: "We entertain no doubt of the authority of the bankruptcy to direct CCC to assign its security to the trustee. It does not follow, however, that the trustee thereby attained the status theretofore occupied by the CCC of a holder in due course of the receipts.

"To the contrary, we think that the rights and title of the trustee are to be measured by the same principles as apply to other property of the bankrupt estate. (213 Fed. Rep., 2nd, 340)

Flood Proves an Equalizer

Laws relating to merchandise stored in warehouses must be strictly construed, according to the ruling of a higher court.

Recently in litigation was a state law which provided that when a warehouseman discovers that any merchandise, particularly perishable foods, is "out of condition," then he may sell it at public auction, and the owner must suffer the resultant financial loss.

The specific testimony detailed the fact that a food shipper held negotiable receipts issued by a warehouseman and representing 546,306 bu. of food products. Then later on, the entire watershed of a nearby river was deluged with rains, resulting in the river carrying an extremely large volume of flood water.

These heavy rains continued, until the river overflowed and flooded large industrial areas, including the locality of the warehouse in question. Thus, the stored foods were damaged. And the warehouseman, deciding the products were "out of condition" per the above law, sold the goods at the highest obtainable price.

But in this case, the higher court judged that the foods thus damaged were not controlled by laws relating to goods "out of condition." Therefore, it called upon each owner to bear the loss.

The court's statement read: "The statute under consideration has no application to the facts in this case. Thus, the next question is: Who is to bear the loss?

"There is but one answer—that is, all of the owners and holders of warehouse receipts for the merchandise in storage at the time of the flood are to bear the loss on a *pro rata* basis." (258 Pac., 2nd, 341)

It is to be noted that the above decision is based on the established law that various depositors of such mingled goods are held to be "tenants in common." Hence where, for any cause not occasioned by the fault of any depositor, the value of the stored goods becomes less than that for which there are outstanding receipts, the loss as between the depositors is borne by each of them at the time of the loss in the proportion which his products bear to the entire mass deposited.

Quite obviously, this doesn't apply in the case of goods accepted for storage and subsequently damaged through the warehouseman's negligence. Here, the warehouseman is liable.

Nevertheless, this new decision illustrates the new strict construction put upon all laws relating to the liability for damage to, or loss of, goods in storage.

Hinges on "Ordinary Care"

"What, precisely, is the legal liability of a warehouseman who stores perishable goods?" This query was often put to the author by food company executives he visited during the past several months.

Lately, a higher court threw additional light on this subject. This was relative to a case where a warehouseman had made some efforts to keep the stored merchandise in good condition—but not enough to justify the conclusion that he had exercised "ordinary care." And so, litigation followed.

Damage to the merchandise, said the higher court, was due to negligence of the warehouseman. In fact, the court gave these reasons for the warehouseman's liability: (1) He did not "turn" the products often enough; (2) he did not properly check their condition, or make suitable tests for heating; and (3) he did not use due care to guard against infestation.

"It follows," declared the court, "that the warehouseman is liable for breach of his duty."

This further explanation was made by the court: A warehouseman is never liable for damage or loss of stored foods unless the testimony proves that he failed to exercise "ordinary care."

He may be said to exercise "ordinary care" if the testimony proves that he employed the same degree of care as would have been used under identical conditions by other prudent warehousemen of average experience. (201 Fed., 2nd, 59)

End (Resume reading on page 80)

LESS CLOGGING WITH Monarch

Any impurities small enough to pass through the orifice of this Fig. 629 nozzle will never clog the single large internal feed hole.

Monarch offers a full line of efficient, dependable, advanced design nozzles to . . . .

- WAX FRUITS
- RINSE VEGETABLES
- POWDER MILK
- DRY EGGS
- WASH FILTER CAKE
- HUMIDIFY BANANA ROOMS

Remember . . .
Make *Monarch* NOZZLES standard equipment for all direct-pressure spraying!

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An ENDURO Stainless Steel ditching rake is used to separate the curd from the whey in a stainless vat fabricated from ENDURO Type 302. Photos courtesy of Damrow Brothers Company, Fond du Lac, Wisconsin.

New types of equipment like this forker-agitator made by Damrow Brothers Company with ENDURO Stainless Steel paddles have taken much of the hard work out of cheesemaking.

Curd is transferred from stainless steel vats to stainless hoops in stainless buckets. Stainless hoops made by Damrow Brothers Company come in various shapes and sizes.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

ENDURO®

Stainless Steel helps rake in profits for cheesemakers

The cheese industry, like all food processors, has been using ENDURO Stainless Steel profitably for over a quarter of a century in all types of processing equipment from ditching rakes to whey tanks.

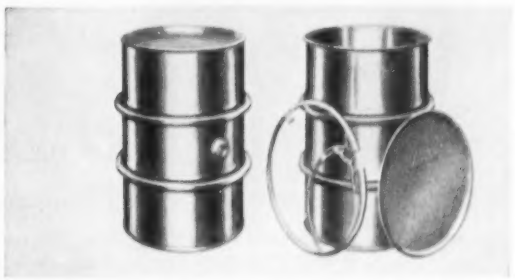
ENDURO Stainless Steel protects quality, purity and flavor in batch after batch of cheese from the time the milk leaves the cow until the cheese is ready for the consumer. For you see, ENDURO is inert. There's no danger of metallic contamination. It does not add unwanted flavor. It never takes anything away.

And the cheesemakers have found other profitable and economical reasons for using ENDURO-made equipment. Downtime between batches is held to a minimum because ENDURO is so easy to clean and keep clean. It is solid stainless steel all the way through. There's no applied surface to crack, chip, flake or peel away. Contaminants have little chance of gaining a foothold on its smooth, hard surface.

Long-range economies are still another advantage of ENDURO food processing equipment. It will take plenty of abuse and yet maintain its sanitary appearance, strength and corrosion-resistance. ENDURO-made equipment lasts and lasts.

What about *your* food processing operation? Perhaps ENDURO's advantages can improve your product, cut costs or boost profits. Your supplier has the facts. Or send us the coupon for more information on ENDURO Stainless Steel for food processing.

ELECTRUNITE® STAINLESS STEEL TUBING AND PIPE convey dairy products, foods and beverages with the positive assurance that there will be no contamination or discoloration. Corrosion-resistance and a wide range of resistance to temperature, pressure and physical damage mean that ELECTRUNITE Stainless Steel Tubing and Pipe will last indefinitely.



ENDURO STAINLESS STEEL DRUMS AND BARRELS provide maximum protection against contamination for your food products during shipping or storing. ENDURO Drums and Barrels resist corrosion. Resist hard use and abuse. They never need painting. Available in sizes up to 55-gallon capacity.

REPUBLIC TITANIUM even surpasses stainless steel in its resistance to corrosion. It is practically immune to the corrosive effects of salt water. Think what this means to you packers of foods in brine. Even such hard-to-handle foods as mayonnaise, tomato and citric juices have absolutely no effect upon titanium. Republic is constantly expanding production to meet your future needs.

REPUBLIC STEEL CORPORATION
Dept. 3160
3160 East 45th Street • Cleveland 27, Ohio

I would like more information on these Republic products for food processing:

- ☐ ENDURO Stainless Steel
- ☐ ENDURO Barrels and Drums
- ☐ ELECTRUNITE Stainless Steel Tubing and Pipe
- ☐ Titanium

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

STEEL

and Steel Products

For more data, circle this page number on card at front →

NEW PACKAGES & PRODUCTS

"NO-STICK" enamel lining in cans makes them ideal for luncheon meats and hams.

4 FLAVORS of Mrs. Stewarts instant jelly base were recently introduced in 6 oz. Canco tins.

LABEL CHANGE for Piel Bros. 12 and 16 oz. cans is aimed at modern design and quick identification.

New Developments In Cans

Supplier offers improved meat can, reinforced milk carton. New products appear in cans

The housewife who has to pry luncheon meat out of a can with a knife appears to have had her problem solved. The answer is American Can Co.'s new enamel-lined can. Made in loaf or bulk shape, the can permits easy and neat removal of the contents, without sticking.

The "no-stick" also boasts a self-tracking tear strip that winds around the key smoothly and easily without slipping. The can is currently being adapted to other products. (146A)

Plastic-Based Milk Carton

Also introduced by the Canco engineers is a plastic-reinforced fiber milk container, the result of the company's search for a stronger and more durable milk carrier. (146B)

Fractures of the fiber board, usually the source of leaks, are prevented during end-sealing by a plastic band around the inside bottom of the container body.

A continuous film of the plastic is applied by an extruding device on the label press.

Debut in Cans

Several products have recently made their first appearance in Canco tins:

- Five new Birds Eye concentrates (tangerine juice, grapefruit juice, orange and grapefruit blend, grape juice, and limeade) are packed in 6 oz. cans with cemented sideseams, permitting all-around lithographed labels.
- Douglas Food Corp.'s potato pancakes are now packed in Canco No. 2 metal cans. The product, called "Pan'Tato", is reported to be the first of its kind to be sold in hermetically sealed containers.

The pancake is packed in one complete piece. It may be sliced to desired thickness for pan-frying. Each can holds 1 lb. 4 oz.—approximately 10 servings.

- An instant jelly base made by Keith Stewart Fruit Products, Inc., is sold in 6 oz. metal cans. The 202 x 314 cans, made by Canco, each make 4 8-oz. glasses of jelly. Four flavors—apple currant, apple raspberry, apple grape, and apple blackberry—are packed. Brand name used is Mrs. Stewart's.

A label change for its 12 and 16 oz. beer cans has been announced by Piel Bros. A blue oval with white and gold lettering is directed at a contemporary design and quick product identification.

Circle key numbers on Reader Service Card

Cheese in Cups

Alcoa aluminum foil is the material used for Kraft Foods Co.'s Party Snack cheese spread line. The 4 oz. Ribfoil cups are made by Basca Manufacturing Co.

Six flavors are marketed: onion soup, bacon with horseradish, pimiento, chives, dates, and clams. Base is pasteurized neufchatel.

The cups are colored to identify the flavor—red, orange, green, yellow, gold, and purple. Cap is a foil-cardboard disk sealed with wax.

Basca has reported a five-fold production increase since Kraft placed its initial order. A second five-fold increase is currently being planned and set up.

Circle 146C on Reader Service Card

Vinyl Food Wrap

Bakelite Company has announced a new rigid vinyl calendered sheet which may be used for direct-contact packaging of foods. The new wrap will allow shipment of dressed and cut meat and poultry in sealed containers with clear top covers.

The material also provides a high degree of dimensional stability and

scoring hits with "junior misses"...

BETTY CROCKER'S NEW JUNIOR BAKING KIT CONTAINS 12 DIFFERENT CAKE MIXES AND FROSTINGS, EACH PACKED IN A POUCH OF RIEGEL'S LAMINATED GLASSINE, POLY-COATED

Protecting the sales-winning qualities of fine products is only one of the many functions of Riegel papers. Saving money is important, too. Riegel does it for you by creating the right combination of the most efficient packaging materials . . . and by "tailor-making" the paper to run and seal at high speeds on your machines. Tell us what you want paper to do for you. Riegel Paper Corporation, P.O. Box 170, Grand Central Sta., New York 17, N. Y.

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GLASSINES AND GREASEPROOFS
Plain • Waxed • Printed
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is FOAM your production BOTTLENECK?

use a Dow Corning silicone defoamer

most efficient, versatile and economical foam-killers known!

one ounce of

ANTIFOAM A — KILLS FOAM IN **35,000 lb.** vitamin B_2

ANTIFOAM AF EMULSION — KILLS FOAM IN **250,000 lb.** molasses

Break that bottleneck . . . speed processing . . . boost productive capacity . . . eliminate waste and fire hazard of boil-overs. Use a Dow Corning silicone defoamer!

It is now permissible to use Antifoam A Compound in processing nonstandardized foods at concentrations up to 10 ppm—water dilutable Antifoam AF Emulsion at concentrations up to 34 ppm.

***Free Sample**—make your own test—send coupon today*

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Please send me:
FREE sample of ☐ Antifoam A Compound; or ☐ Antifoam AF Emulsion;
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a low rate of water absorption besides resistance to oils, grease and other chemicals. Readily vacuum formed into bowl, tray, or contour shapes, it can be heat sealed.

Economy to processor and distributor is seen in the fact that the lightweight, easily stacked containers reduce freight costs and handling charges. Also, the packages attractiveness will eliminate need of handling and repackaging at the retail point.

Circle 146C on Reader Service Card

Basket o' Wieners

Quixee plastic baskets are now used to package frankfurters. Made by Gilbert Plastics, the basket protects the product, adds an unusual sales appeal, and has a re-use value.

Overwrapped with cellophane or plastic film, the baskets are said to be competitively priced with paper board. They may be wrapped manually or machine-wrapped on Hayssen or Package Machinery FA Model wrappers.

Circle 148A on Reader Service Card

Brand-Tagging Grapes

A low-cost method of creating brand identification for grapes is a lithographed tag developed by H. S. Crocker Co. Reverse side of the tag contains explanatory copy.

Circle 148B on Reader Service Card

Complete Corn Bread Mix

No mess, no fuss for the consumer is the aim behind Quaker Oats Co.'s new Aunt Jemina's corn bread mix. The package comes complete with a foil baking pan and a plastic mixing bag of ingredients.

Convenience for the housewife begins with the opening of the foil wrapped carton with a zip-tape. A cup of milk and an egg is added to the bag and it is kneaded for 40 min. It is then placed in the pan and baked for 20 min. at 425 deg. F.

Recipe on Neckband

A neckband printed with a recipe for Russian Dressing is being used on H. J. Heinz's chili sauce bottles.

The band is used to provide the shopper with an in-store shopping list of ingredients for the dressing, as well as kitchen instructions. The recipe is the first in a planned series.

Film Coffee Bag

Foreseen as making the in-store grinding of coffee obsolete is a Pliofilm-lined bag developed by Goodyear Tire and Rubber Co. The bags are now being used by Colonial Stores,

"No more sad sacks!"

Plant food sacks don't sag, bags don't break, when they're protected by H&D corrugated boxes. H&D packaging will keep your products in good shape, too.

HINDE & DAUCH

Subsidiary of West Virginia Pulp and Paper Company

AUTHORITY ON PACKAGING • SANDUSKY, OHIO
13 FACTORIES • 42 SALES OFFICES

"Customers now tell us they want all their beans packaged this way." Here is a typical display in the Worth Food Market No. 22, Ft. Worth, Tex. Bags are supplied by **Modern Packages, Inc.**, Los Angeles, Calif.

"with polyethylene bags

we achieve very handsome displays"

That's a retail advantage of packaging processed foods in film made of BAKELITE Brand Polyethylene. But it's only one of the reasons why Potts Wilson Company, Ft. Worth, Tex., turned to polyethylene for their nationally distributed bean line . . even though they had to redesign all their packages and purchase new machinery.

"We believe," says William S. Potts, partner, "that damage to packages will be reduced up to 80% or more. These polyethylene bags are strong and pliable, stack readily on shelves, cannot shrink or dry out, are waterproof, have unlimited shelf life, can be used again and again as food-saver bags, and best of all, they will break only under extreme abuse."

Talk to *your* packaging supplier. Find out how you can also benefit by packaging in film made of BAKELITE Polyethylene. Or, for our "Processed Foods" packaging booklet, write Dept. TL-63.

It pays to package in film made of

BAKELITE
BRAND
Polyethylene Plastic

BAKELITE COMPANY, *A Division of Union Carbide and Carbon Corporation* UCC 30 East 42nd Street, New York 17, N. Y.

The term BAKELITE and the Trefoil Symbol are registered trade-marks of UCC

Atlanta, after successful market testing.

Colonial reports that the new package cuts shrinkage and slow-up of customer traffic. Another advantage is the space gained by removal of grinding equipment.

Circle 148C on Reader Service Card

Pancake Breakfast

A new carry-away carton used by Virginia Syrup and Candy Corp. combines a package of standard pancake mix with a bottle of the processor's maple syrup.

Made by Hinde and Dauch, the box has a heavy-duty carrying handle. Side walls are triple strength, effective in stacking. Front of box is die-cut to reveal syrup and pancake mix labels.

Circle 151A on Reader Service Card

New Cover for Cans

Continental Can Co. has announced an improved cover for 3 lb. shortening cans. Objective was to provide a more positive closure than standard covers.

Lugs and dimples have been replaced with an elongated cover shape that retains its form and maintains pressure against the can collar.

Circle 151B on Reader Service Card

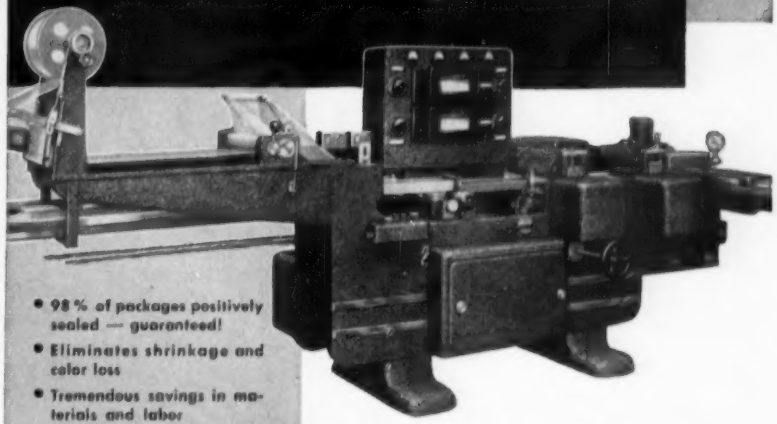
Competition for Oleo

Reported to resemble butter in taste and appearance is John Morrell & Co.'s new "golden lard."

Packaged in 1 and 3 lb. cans, the product was developed by L. B. Liddy, chief of the dairy and foods division of the Iowa Department of Agriculture. The finely textured lard is said to have all the advantages of vegetable

VACUUM PACK
SLICED LUNCHEON MEATS
AND OTHER FOODS WITH
Guaranteed SEALING

Fast operating CAMPBELL Wrapper Seals in flavor, freshness and color... with
Less than 2% package "Leakers"



- 98% of packages positively sealed — guaranteed!
- Eliminates shrinkage and color loss
- Tremendous savings in materials and labor
- 40 to 70 units per minute — double head
- Reduces spoilage — extends shelf life
- Increases sales appeal — wins new customers.

Guarantee

It is hereby guaranteed that out of every 100 units Vacuum-packed on a CAMPBELL Vacuum Pack Meat and Food Wrapper in regular production service — 98% or more will be positively sealed against leakage at sealing areas of heat-sealing wrapping material used for the package.

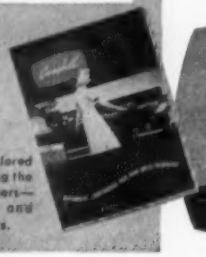
HUDSON-SHARP MACHINE CO.
GREEN BAY, WISCONSIN

DRASTIC SAVINGS IN PACKAGING MATERIALS AND LABOR ACTUALLY PAY FOR MACHINE IN *FOUR TO SIX MONTHS TIME!*

Amazing, but true—and field proven by America's leading packers. Automatic, the machine requires only one person for push-button operation. And, savings up to 65% on wrapping materials alone are effected because wrapper tightly hugs the product—requires no costly bags, double wraps or large overlaps to insure *guaranteed* positive sealing.

High Speed Production — Sharply increased production effects further savings, too. Continuous feed, double vacuum head machine produces 40 to 70 units per minute—dependent upon wrap materials used. Single head machine—20 units and up.

Get The Facts Today — Learn about this revolutionary, new VACUUM PACK Wrapper — how and why its "leak-proof" packaging production can be *guaranteed*. Write for full particulars.



Write for full colored brochure describing the CAMPBELL Wrappers—how they wrap and seal many products.

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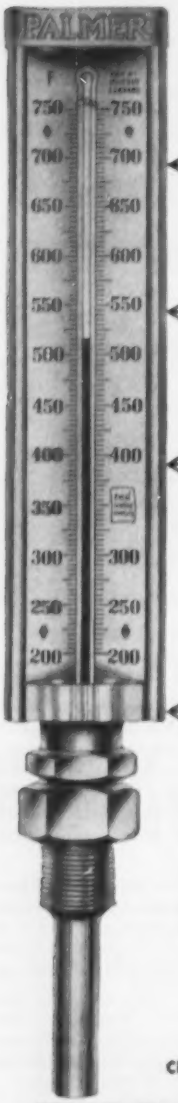
HUDSON-SHARP MACHINE CO. • GREEN BAY, WIS.
Manufacturers of Aniline and Gravure Presses, Folders, Interfolders, Laminators, Waxers, Embossers, Slitters, Sheeters, Roll-Winders, Packaging Machines, Creepers and Tissue Converting Units.

Today's Modern Industry
Demands a Modern Thermometer

PALMER

RED-READING MERCURY THERMOMETERS



Red-Reading Mercury

Extruded Brass Case

Chrome Finish

Ranges −40 to 950°F or Equivalent in °C

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PALMER

THERMOMETERS, INC.

Mfrs. of Industrial Laboratory, Recording and Dial Thermometers

Cincinnati 12, O.

shortening though it retails for 20% less.

The new lard is smokeless and odorless, has a minimum fat absorption, is easily digestible and has a very high smoke point (400 deg. F). In addition, it provides pork manufacturers with a larger market for lard.

New Dress for Mix

A glistening aluminum foil overwrap has replaced the familiar canister of Baker's Instant Chocolate Mix. Also featured on the new package is a corner pour-spout.

Sizes for the foil-dressed carton will be 2, 1, and ½ lb. Label for the new package is bolder and offers more sales appeal than the old display face.

New Product Shorts

Borscht in a Decanter is a new product of I. Rokeach & Sons, New York.

Instant Bouillon is newest Wyler product. Jar makes 21 cups or may be used to make sauces, gravies, etc.

Old Songs decorate the label of William Gretz Brewing Co.'s canned beer.

New Lemon Oil has been developed by Sunkist Growers Inc. Reported to be less expensive than standard or regular oil.

Newest Beverage Flavor is Cocoa-Mint of Kirsch Beverages, Inc., New York. Packaged in individual 12-oz. serving bottle.

San Francisco Brewer, Lucky Lager, has adopted American Can Co.'s recently developed quart beer can. Can features recessed bottom for stacking and easily removed cap.

—End—

35 New MH Units

—Continued from page 56

Among the fastest selling units in recent years, he continued, are the dock-loading devices that provide safer, faster handling between trucks and rail cars and shipping and receiving docks.

Companies with efficient systems involving over-the-floor equipment have doubled and even tripled handling effectiveness during shipping and receiving.

This has been especially true where dock-leveling devices have been employed, according to Oster Executive V.-P. C. W. Choromanski.

In a broader approach, Gilbert W. Chapman, president of the Yale & Towne Co., New York City, declared that the "Cold War" had now entered a phase of intense economic rivalry. He urged American businessmen—whom he described as a current "front-line army"—to follow this 4-point industrial program:

1. Improve and expand mass-production techniques – the essence of which is materials handling.

2. Examine trade policies with other nations in the light of national interest. As the leader and hope of the free world, America must reexamine and improve economic relations with other nations. Businessmen must not hesitate to encourage national leaders toward such solutions as lower tariffs. Whatever the problem in foreign trade, intelligent solutions must be formulated in a manner representative of a leader.

3. Fight hard against obsolescence through intensification of research and development.

4. Recognize that industry must play an increasingly important role in the preservation of the U. S.

Advanced handling equipment and accelerated movement through better use of these units will, he said, better equip the U. S. to fight and win this economic war. By cutting production and distribution costs, this country will remain competitive against totalitarian states.

Index of industry growth, he continued, is the range of equipment now manufactured in industrial lift trucks. Load capacities extend up to 150,000 lb., and trucks are made in gas, electric, diesel, and LP-gas models.

Yale & Towne engineers, it was revealed, are working on problems which are "still around the corner" – but which are expected to produce future demands for fork-truck equipment. Here, they have even been evaluating the possibilities of atomic power for fork trucks.

Finally, there was the prediction by this company's V.-P. Elmer F. Twyman of a 100% increase in the materials handling equipment business in 10 years or less.

End *(Resume reading on page 57)*

You get uniform closures at high speed with this production team

BLISS No. 1831
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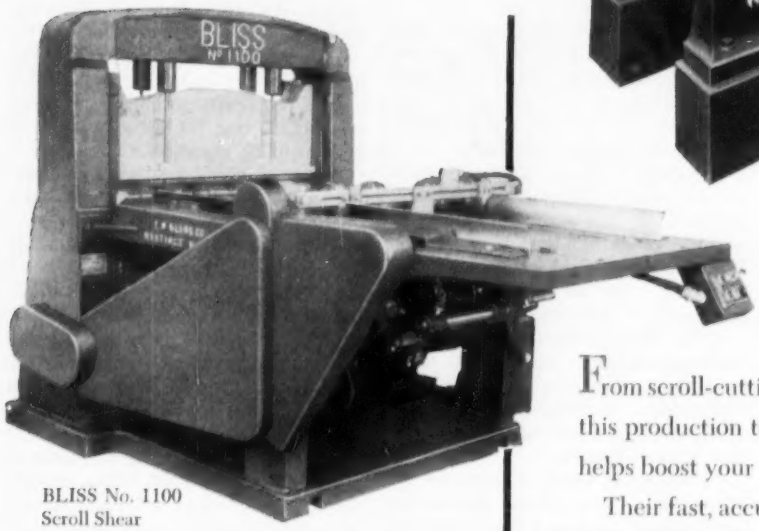

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Scroll Shear

From scroll-cutting tinplate to forming closure blanks, this production team gives you **uniform closures,** and helps boost your output while cutting costs.

Their fast, accurate feeds, for example, give you the speed you need. The counterbalanced slides... counterbalanced crankshafts... fast, smooth clutches—all these assure you of close-tolerance blanking, forming and scroll-cutting **for every run.** What's more, long gibbed slides and guides protect your dies.

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When so much depends on uniform closures, it makes sense to depend on Bliss. To get more information on Bliss' high-speed scroll shear and strip feed press, write for Sections 1 and 2, Catalog 36-B.

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Facing Automation

—*Continued from page 57*

unit prints data in red if they exceed a pre-set limit for a particular instrument. Thus, the panel attendant or engineer sees at a glance which data are off standard.

Economics . . .

The amazing potential of automation challenges the imagination of those looking to the future. Of course, the cost of these systems will be prohibitive for the very small food firm. Is automation then only for giants in industry?

Take this statement by Paul B. Wishart, president, Minneapolis-Honeywell Regulator Co.*

"Small business must expect that its course will be altered by the growing used of automation. It can be caught flat-footed—or it can anticipate and plan a realistic course and minimize coming competitive pressures.

"Statistics indicate that small business is rapidly adopting automation methods. It can and will prosper in a world of automation—if it is careful to pick its field of operation or gradually 'tailor' its present operations to counter visible trends.

"The accelerating use of industrial instrumentation in small plants offers fruitful opportunities to profit from automation. Such modernization will bring about a reduction in costs and will increase quality.

"Indications seem to point in the direction of standardized automation equipment developed to meet the common denominator requirements of hundreds of small- and medium-sized companies. In this way, the cost will be noticeably reduced."

What will be the effects of automation on our society?

Congressional Studies

Under the Employment Act of 1946, the Joint Committee on the Economic Report is charged with making continuing studies of matters relating to employment, stability, and growth.

A subcommittee of the Joint Committee on the Economic Report recently undertook a search, through public hearings, for policies designed to insure that long-run good from increased productivity will not produce serious or undue short-run unemployment and dislocation.

Management's forecast: D. J. Davis, Ford's vice-president in charge of manufacturing, told the committee that his company regards increasing use of electronic and automatic machines as another evolutionary phase of its advancing production technology.

Automation, he said, should cause no more than a gradual shift of employment. It has supplanted heavy, dangerous and unpleasant work. And the number of skilled, higher paying jobs has substantially increased.

Labor's view: CIO President Walter Reuther, when called to testify, said: "Machines hold the promise of a better life for all citizens, if the fruits of more efficient production can be shared equitably. We have mastered the know-how of mass production. Now, we must master the know-how of mass distribution.

"Consumer purchasing power will have to be developed through higher wages, tax relief, and other workers' benefits, so that the growing flood of goods can be marketed."

In other words, consumer purchasing power must keep pace with production.

Where achievement of productivity and product quality is essentially an art, it follows that performance will be subject to variations because of primary dependence upon the human element, with accompanying variations in working rate and judgment. This is then a potential area of application for automation.

A survey undertaken by General Foods among 75% of its top officials showed that continued progress will be gradually made in the application of automation to grocery manufacturing in the next ten years.

Many of the executives felt that automation will result in benefits to the consumer, such as providing better quality products at lower cost.

End (*Resume reading on page 58*)

* At the San Francisco symposium (1955) on "Electronics and Automatic Production", sponsored by the National Industrial Conference Board, Inc., and Stanford Research Institute.

New Washing Technique

—*Continued from page 85*

true for sound, firm, red raspberries. Experiments were run on several hundred pounds from each type of line.

Occasionally encountered are red raspberries that are soft and crumbly as a result of inclement weather or poorly timed harvest. Such fruit gives a lower yield in the processing line than sound, firm berries of optimum maturity. Thus, it can be expected that such fruit will be broken up somewhat more in the line employing a wetting agent than in the one using only water.

Use of a wetting agent in the cleaning process causes no measurable change in soluble-solids content of cleaned berries as determined by refractometer. Leaching of solids is about the same by both methods.

Analyses for residual wetting agent give results ranging 0-25 ppm., the method[4] involving a laborious extraction. With raspberries, only about one-third of the wetting agent actually present in the sample can be extracted and measured. Consequently, the 25 ppm. reported above means that about 8 ppm. was actually detected.

Preserves were prepared from black raspberries cleaned with use of wetting agent and from berries cleaned in water only. No differences were observed in the preserve-making process, or in visual inspection and tasting of finished products. No adverse effects on color, texture, or other quality factors appeared in processed berries that were washed in a wetting-agent solution.

Re Toxicity

Various applications[2, 3, 4, 5] of wetting agents in preparing foods for processing have been described. There is precedent for their use in cleaning of fruits and vegetables. But it must be remembered that certain types of wetting agents and detergents have been forbidden for use on foods directly. Therefore, it is important to obtain wetting agents from a commercial source that can supply advice on chemical composition and suitability for the purpose.

In a report on use of certain chemicals on foods[6] in which alkyl aryl sulfates and alkyl aryl sulfonates (anionic agents) are discussed, Arnold J. Lehman of FD&A stated: "These compounds are moderately toxic and could be used for washing fruits and vegetables, provided adequate rinsing is practiced following the application of the wetting agent."

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End (Resume reading on page 86)

Hoerner Boxes, Inc.
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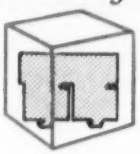
for  *10 years . . .*

Ruberoid roofing and siding products have been protecting American homes for years. For the past ten years, Hoerner corrugated containers have been protecting Ruberoid products from plant to construction site. Like the Ruberoid products over your head, Hoerner corrugated boxes are rugged and dependable. We think you'll like a Hoerner corrugated container roof over your product.

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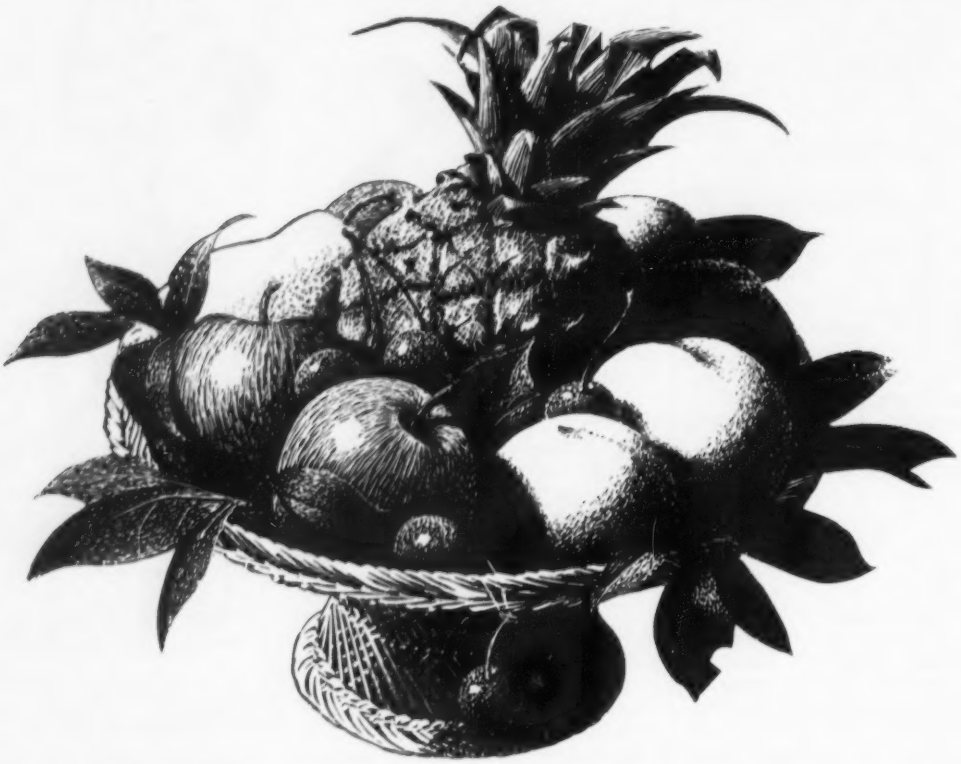
What can make these good foods better?



The foods shown here, like many others, are subject to oxidation during processing. Ascorbic acid will make them better by protecting them from the loss of natural color and flavor which oxidation causes. Small quantities of added ascorbic acid will greatly retard this action. When you use ascorbic acid in the easy, inexpensive Roche method to keep Nature's color and flavor in the foods you process, retail customers like them better and buy more.

We have helped many food processors to make their good foods better and we're ready to help you. Why not investigate the use of Roche ascorbic acid (vitamin C) today?

Quick Facts about Ascorbic Acid (vitamin C)

Roche ascorbic acid, as an anti-oxidant, protects natural color and flavor at low cost—
in frozen apples, apple sauce, apricots, sweet cherries, fruit cocktail,
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white fish, lake trout and in frozen swordfish steaks *in ice cream.*
in packaged beer *in citrus oil emulsions.*

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ADVANCES IN TECHNOLOGY

Sprays Impart Off-Flavors

Sprout depressant sprays, such as tetrachloronitrobenzene (TCNB) can have an effect on flavor of dehydrated potato products.

This was shown in tests on King Edward potatoes grown in Aberdeenshire (Scotland) that were harvested in Oct. and dusted with 3% 2,3,5,6-tetrachloro-1-nitrobenzene in an inert carrier, at the rate of 10 lb. per ton.

Dehydrated potatoes, in the form of strips ⅜x⅜ in. cross section, prepared from them were found by two taste panels to have a persistent earthy taint that increased with time of storage of the potatoes.

The taint was still apparent after a year of storage of the dehydrated product under temperate conditions. Heavy leaching during processing reduced the taint but did not eliminate it.—*Journal of the Science of Food & Agriculture*, 7, 411-16, 1956.

Inhibiting Citrus Mold

Packaging paper impregnated with a composition of diphenyl, lemon oil, paraffin oil, and paraffin wax will effectively prevent deterioration of citrus fruit due to mold growth during transportation and storage.

The patented process is applicable to individual tissue wrappers, paper liners for crates, walls of paperboard boxes, and inner ply of multi-ply paper bags.

Diphenyl is the inhibitor, the undesirable odor of which is masked by lemon oil. Paraffin oil and wax are the solvent carriers of the diphenyl and lemon oil. Bergamot oil or a mixture thereof with lemon oil may also be used.

Quantity of diphenyl in wrappers may vary between 0.012 and 0.022% of total weight of fruit packaged, depending on length of time the fruit is to remain stored. Greater quantities may be used in other forms of packaging paper.

Amount of lemon oil will vary from 1.75 to 2.00% of the weight of the diphenyl. A suitable formula in percent by weight for impregnating tissue wrappers contains: Paraffin oil, 65.7; paraffin wax, 11.0; diphenyl, 22.9; and lemon oil, 0.4. For crate liners and wall boards the respective percentages are 34.0, 15.0, 50.0, and 1.0—U.S. Patent 2,746,872, May 22, 1956.

Resistance of Different Microorganisms To Irradiation by Cathode Rays

Cathode ray irradiation of bacteria on disks of filter paper sealed in double polyethylene envelopes, showed that Gram negative bacteria were more sensitive to the rays than Gram positive organisms.

All non-spore forming bacteria were susceptible to 0.5 megarep or less. Vegetative cells were more sensitive than spores of the same organisms. Most resistant species was *Diplococcus pneumoniae*.

Higher doses are required as number of cells exposed to irradiation increases, either by increase in concentration at constant volume or by increase in volume with the concentration held constant.

For species of *Penicillium* the lethal dose was about 200,000 reps; *Aspergillus* were killed by 300,000 reps, and *Saccharomyces cerevisiae* by 600,000 reps. *Candida* species withstood somewhat greater doses than did *Saccharomyces* species of yeasts. Presence of cysteine hydrochloride (0.01 molar) did not increase the radiation resistance of two species of *Candida*.

To sterilize suspensions of bacterial spores, doses of 0.6 to 2.1 megareps were required, and species of *Clostridium* were not more resistant than *Bacillus*.

The moist spores were more resistant than frozen or dried ones. Irradiation by cathode rays from the 2 MEV Van de Graaff generator used in these experiments does not seem to induce mutation in *E. coli*. Survivors of doses of 10,000-70,000 reps had the same nutritional requirements, catalase activity, and susceptibility to irradiation as the parent strain.—*Applied Microbiology*, 143-55, March, 1956.

Alginate From Seaweed

Sodium alginate is usually obtained from kelps, such as species of *Laminaria*, *Macrocystis*, and *Nerocystis*. However, it may be produced from other seaweeds, such as *Fucus vesiculosis* and *Ascophyllum nodosum*, though its quality is usually inferior to that obtained from kelps.

Using *F. vesiculosis* and *L. digitata* collected at Halifax in Aug. and Sept., sodium alginate was prepared by extraction of the dried weed with 0.5% $Ca(OH)_2$, followed by 0.2 N H_2SO_4 and 3% Na_2CO_3.

Combined extracts were filtered, bleached, and calcium alginate was precipitated with $CaCl_2$ solution. Alginic acid and sodium alginate were then prepared by first precipitating the acid with HCl and ethanol, followed by solution in NaOH.

A colorless product could be obtained with little loss of viscosity by filtering the crude alginate solution through an activated carbon-diatomaceous earth column, careful bleaching with NaOCl or by thorough extraction of the weed with methanol before extraction of the alginate. A preliminary precipitation of the crude alginate with ethanol also produced a final product with a higher viscosity.

While sodium alginate with a viscosity of 3.7-8.2 centipoises can be produced from *F. vesiculosis*, it is a more difficult source than the kelps, and may be a different alginate. Yields are of the order of 15-18% on dried weed.—*Canadian J. of Technology*, 34(4), 220-26; 1956.

Casing For Plastic Foods

Novelty is claimed for a patented tubular container for sausages or other plastic foods.

Casing is formed of flexible material, such as cellophane or a textile fabric. But instead of being tied at the ends in the conventional manner, the package has rigid end walls in the form of disks of wax-impregnated cardboard or like material. These have peripheral grooves into which the tubular body can be tightly tied by means of string, thus effectively sealing the package.

Shape of container facilitates slicing the entire contents in portions of uniform size and shape, thus reducing waste incurred in containers of irregular size and shape.

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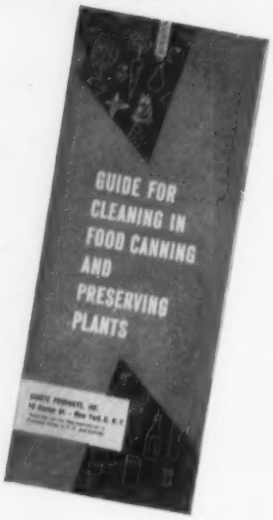

If you're searching for better, more effective ways to slash rising maintenance costs, add this newest Oakite Guide on plant sanitation to your list of required reading.

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tainer is the structure of one of the end walls. This disk is provided with a circular, self-closing inlet through which the sausage or other food can be forced into the casing. After casing is filled and nozzle of filling machine withdrawn, the aperture is closed with a plug that is pressed into place and frictionally held in position. —U.S. Patent 2,751,306, June 19, 1956.

Condiment Composition

Avoiding the disadvantages usually encountered in making a dry seasoning material, a patented process yields a concentrated spiced food paste containing a mixture of many condiments.

The following ingredients are used: Coriander, fenugreek, garlic, dill seeds, allspice, salt, saffron, turmeric, mace, bay leaf, cinnamon, onions, chili powder, cayenne pepper, ginger, cumin, white pepper corns, and mustard seeds.

These materials are thoroughly pulverized and mixed, and then made into a paste with coconut juice obtained by grating and squeezing the white of the coconut. This paste is then cooked in boiling peanut oil for an hour, after which it may be canned or bottled. It will keep indefinitely without flavor deterioration.

Paste may be used as a food or as a seasoning for meats and other products.—U.S. Patent 2,746,869, May 22, 1956.

Predicting Pasteurization Temperatures for Milk

Elimination of the holding period by increasing the temperature so that the entire lethal effect of pasteurization is due to heating and cooling of milk has been explored.

In tests made with *Micrococcus freudenreichii* (MS66) and *Streptococcus thermophilus*, their thermal resistance was determined from 139-151 F. for the holding procedure, and from 165-185 F. for a continuous flow procedure in which heating time from 140-180 F. was 0.3 sec., holding time at 180 F. 0.13 sec., and cooling to below 140 F., 0.1 sec.

From plots of logarithms of numbers of surviving organisms against times of exposure, "D" values (time in min. required for rate of destruction values to pass over one logarithm cycle) could be estimated.

At 143 F. the D value for *M. freudenreichii* was 6.3 or 8.4, depending on method of calculating it. For *S. thermophilus*, which is more

Using Salt Efficiently

by **INTERNATIONAL SALT COMPANY, INC.**—America's largest producer of salt

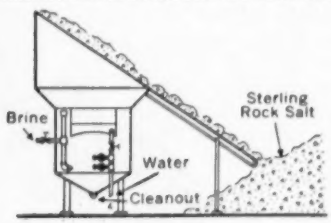
Combining Storage and Feeding Makes Salt Handling Easier

To save both time and manpower in salt handling—many plants have installed salt-storage units which feed directly into a salt dissolver. These units are particularly useful in plants where large tonnages of salt are consumed every day. But even in smaller plants, combination storage and feeding units are proving valuable. This is because they cut down on the amount of floor space needed to store salt.

In plants where floor space is at a premium, salt is often purchased in bags to permit high stacking. Here, too, combination storage and feeding units can produce substantial savings. They permit the purchase of economical bulk rock salt—and reduce salt-handling costs to a minimum.

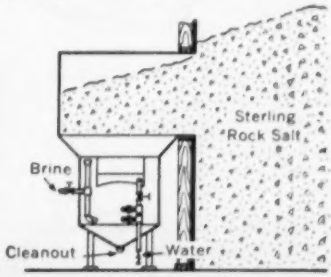
What about one of these units for your plant? Here are six of the most practical designs for combining salt storage and feeding. One of them—or an adaptation of the basic design—may be effective in saving floor space and lowering salt-handling costs for you.

1. Filling dissolver from floor pile. If salt must be stored in bulk on the same floor



as the dissolver (all dissolvers shown here are International's famous Sterling Model Lixator), an excellent feeding device is a portable belt conveyor. The best type for moving salt is made of aluminum with a rubber belt, and is between 16′ and 20′ long. The same conveyor moves salt not only from a floor pile into the Lixator, but also from a car or truck into the plant.

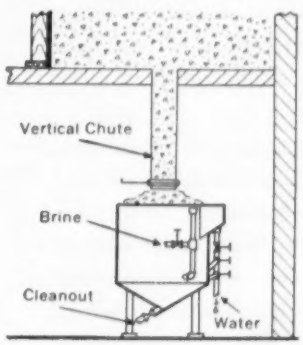
2. Wall-type hopper, bolted directly to an opening in a salt-storage bin. As long as



the salt supply in the bin is sufficiently high to permit gravity flow into the Lixator hopper, feeding will be automatic. When salt supply is no longer self-feeding, the operator stands on the salt in the bin and shovels directly into the hopper.

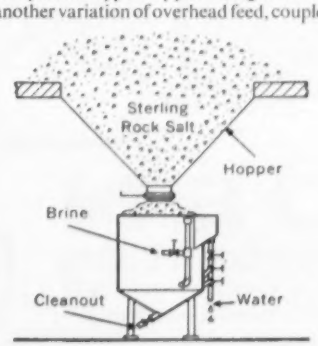
3. Overhead storage with gravity feed into hopper. This design is often used when uninterrupted salt feed is needed, but the storage floor has relatively little salt capacity. A cylindrical-type hopper directly under the hatch holds a large amount of salt for feeding the Lixator—and acts as a substantial secondary storage unit. Ordinarily, though, if salt can be stored above the Lixator, the next design is preferable.

4. Overhead storage with vertical chute. This direct-feed unit is a practical, econom-



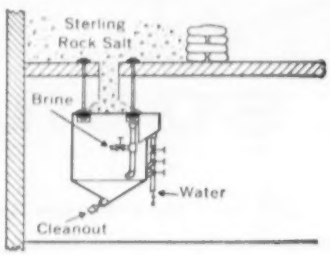
ical way of operating the Lixator. If storage capacity on floor above is large enough, no hopper is needed, which means a considerable saving. Feed is automatic because of angle of repose for salt.

5. Pyramid-type hopper design. This is another variation of overhead feed, coupled



with large storage capacity. But if storage space on floor above is limited, this design is also practical. Salt can simply be dropped into the hopper through a large hatch with a removable cover.

6. Lixator hung above floor, to save floor space. A very desirable design when



floor space is at a premium. Design here also shows use of a few salt bags to act as a storage-bin wall—in lieu of a permanent bin structure.

One final note about the equipment shown here. All Lixators operate on exactly the same principle. They vary only in size and capacity, and in methods of delivering salt to the dissolver unit. All Lixator designs are exclusive International Salt Co. developments, properly protected by patents and patents pending.

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Through skilled and experienced "Salt Specialists," International can help you get greater efficiency and economy from the salt you use. International produces both Sterling Evaporated and Sterling Rock Salt in all types and sizes. And we also make automatic dissolvers in metal or plastic for both kinds of salt. So we can recommend the type and size of salt most perfectly suited to your needs.

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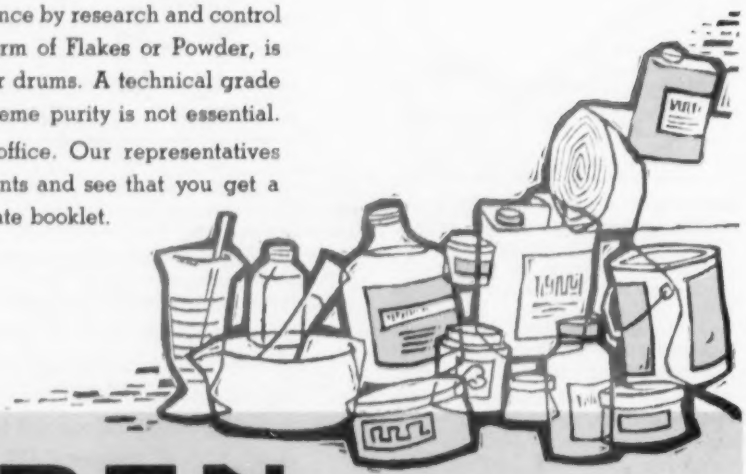
Since all foods and beverages may contain bacteria or molds in varying amounts, a threat to the quality and reputation of your product is always present. To protect flavor, freshness, appearance and taste, Heyden Sodium Benzoate can be used as a safe, effective preservative. It's economical insurance; just 1/10 of 1% will help keep margarine, soft drinks, jellies, juices, condiments and other products from spoiling.

Heyden—a long established producer of Sodium Benzoate—maintains highest purity and uniformity through modern specially designed equipment and close surveillance by research and control chemists. The U.S.P. Grade, in the form of Flakes or Powder, is available in 100, 50 and 25 pound fiber drums. A technical grade is supplied for applications where extreme purity is not essential.

Contact the nearest Heyden sales office. Our representatives will be glad to discuss your requirements and see that you get a copy of our informative Sodium Benzoate booklet.



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resistant to pasteurization, the figures were 23.2 and 24.7 min.

At 174 F. for the continuous flow method, D values for *M. freudenreichii* were 0.00079 to 0.00086, for *S. thermophilus*, 0.0010 to 0.0026 min. For *M. freudenreichii* the D values for continuous flow pasteurization were predictable with 95% confidence from the D values for the holding method, but the D values for *S. thermophilus* could not be so predicted.—*Applied Microbiology*, 133-40, March, 1956.

Vacuum-Packed Cheese

Based on the discovery that cured natural and processed cheese will selectively dissolve or absorb CO_2, a method of packaging has been patented that effectively prevents growth of mold on cheese.

Packaging material must be flexible, pliable, heat-sealable, and impervious to passage of air and CO_2, conditions that are easily met by a number of plastic wrappers.

In operation, cheese is placed in an open package and flushed with CO_2, displacing most of the air. Vacuum of 27 in. is then applied to exhaust practically all of the gas, and the wrapper is heat-sealed while under vacuum.

Volume of gas remaining in a ½-lb. package has been found to exceed 1.0 ml. But after standing for about 3 days it is absorbed by the cheese, thus producing a higher degree of vacuum than existed at the time of sealing. This draws the wrapper tightly around the cheese and forms a package which, in the absence of air, prevents mold growth.—U.S. Patent 2,753,268, July 3, 1956.

Host-Phage Relationship Of Starter Organisms

It is accepted that every strain of lactic streptococcus used as starter in the cheese factory will ultimately be attacked by phage. Once established, it is perpetuated as long as the strain is used.

Since prevention of initial infection seems impossible, solution of the problem has been attempted in two ways: (1) Protection of starter cultures through aseptic propagation, and (2) use of phage-resistant, phage-carrying, and lysogenic cultures. Latter type cultures are subject of two parts of this article.

The first method, applying the single strain starter system, is practiced extensively in New Zealand and Australia. It is based on daily rotation of

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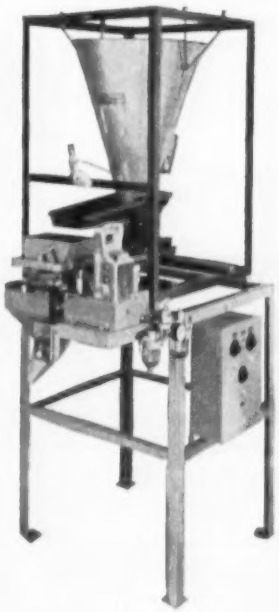

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Model 620 NW has a rated capacity of 10 lbs.—Model 610 NW has a 3 lb. capacity. Write for Form #3318 for further specifications.

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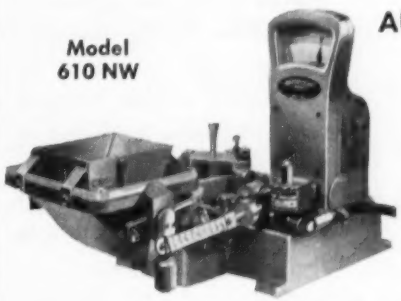

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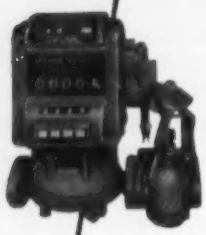

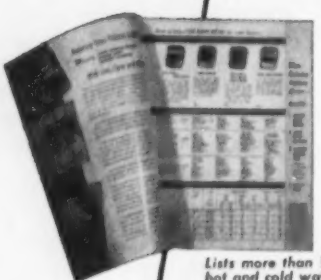

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phage-unrelated strains used in pairs, usually 4 pairs of strains. This provides an interval of 4 days which allows dispersion of phage to a concentration below the critical level.

Due to disappointing results with the second method, it does not appear to have any value at present.

Criteria as to whether a strain is sufficiently unrelated to be used in first method include: Susceptibility to a different phage pattern, and inability to carry phage specific for any of the other strains used.

The pairs are usually blended in the vat or in the bulk starter vessel. To be effective the strains must be compatible. In every case each strain should also be unaffected by the lysis of the other strain in the pair.—*J. of Dairy Research* (Great Britain), 120-33, Feb. 1956.

Size of Colloidal Particles Influences Beer Stability

Chill haze in beer is reduced in samples subjected to ultra-filtration through collodion membranes, indicating that this defect is due to the larger colloidal particles.

Prediction of susceptibility to the phenomenon is based on: Degree of turbidity produced by saturation of the beer with magnesium sulfate, or by precipitation with molybdic acid, ammonium sulfate, or Esbach's reagent (picric acid).

Magnesium sulfate precipitation affects the larger particles responsible for chill haze, but also throws out some albumin. Molybdic acid precipitates both small and large particles. Esbach's reagent gives good prediction of chill stability when it is used on beers of the same original gravity. Hartong's ammonium sulfate precipitation limit test is also a good criterion of chill stability.

All of these tests should be carried out on fresh beer, as with older ones stability is less related to particle size than to physico-chemical and electronic structure.—*Brasserie et Malterie de Belgique*, 134-43, April, 1956.

Oxidation Sensitivity of Beer

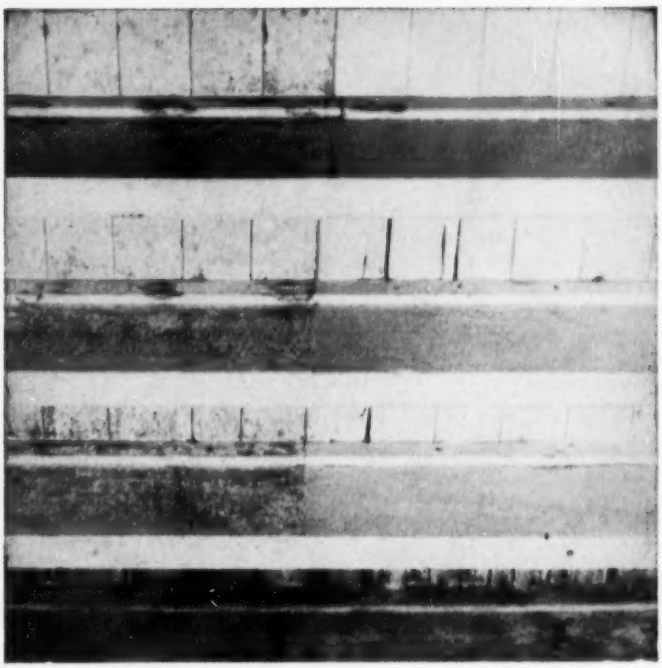
The Indicator Time Test (ITT), time in seconds required for beer to decolorize a measured amount of 2,6-dichloroindophenol (Tillman's reagent), has been a widely used measure of beer reducing powers.

It has a number of shortcomings as a quantitative method, since it is strongly influenced by pH and temperature, and gives no measure of quantity of reducing substances pres-

NEW DU PONT ODORLESS MILDEW-RESISTANT ENAMEL

solves mildew problem in hundreds of food plants

Food-plant managers across the country have found that Du Pont Odorless Mildew-Resistant Enamel Oyster White retards the growth of most types of mildew on walls and ceilings. Formulated with solubilized copper-8-quinolinolate fungicide, Du Pont Mildew-Resistant Enamel is especially suitable for meat-packing plants, poultry and cheese plants, creameries and other areas where mildew presents a major problem. Tests prove that in most types of food processing plants it effectively retards mildew formation for months . . . eliminates the need for constant cleaning and scrubbing. And Du Pont Mildew-Resistant Enamel resists chipping and cracking . . . stays bright-looking month after month. What's more, when you consider the expense of constant cleaning, you'll realize just how economical this superior maintenance finish is. Mail the coupon today for complete information.



Photograph shows section of beamed ceiling in food-processing plant after three years' exposure. Lower strip: cleaned but left unpainted. Upper left: painted with ordinary non-fungicide enamel. Upper right: painted with Du Pont Mildew-Resistant Enamel.

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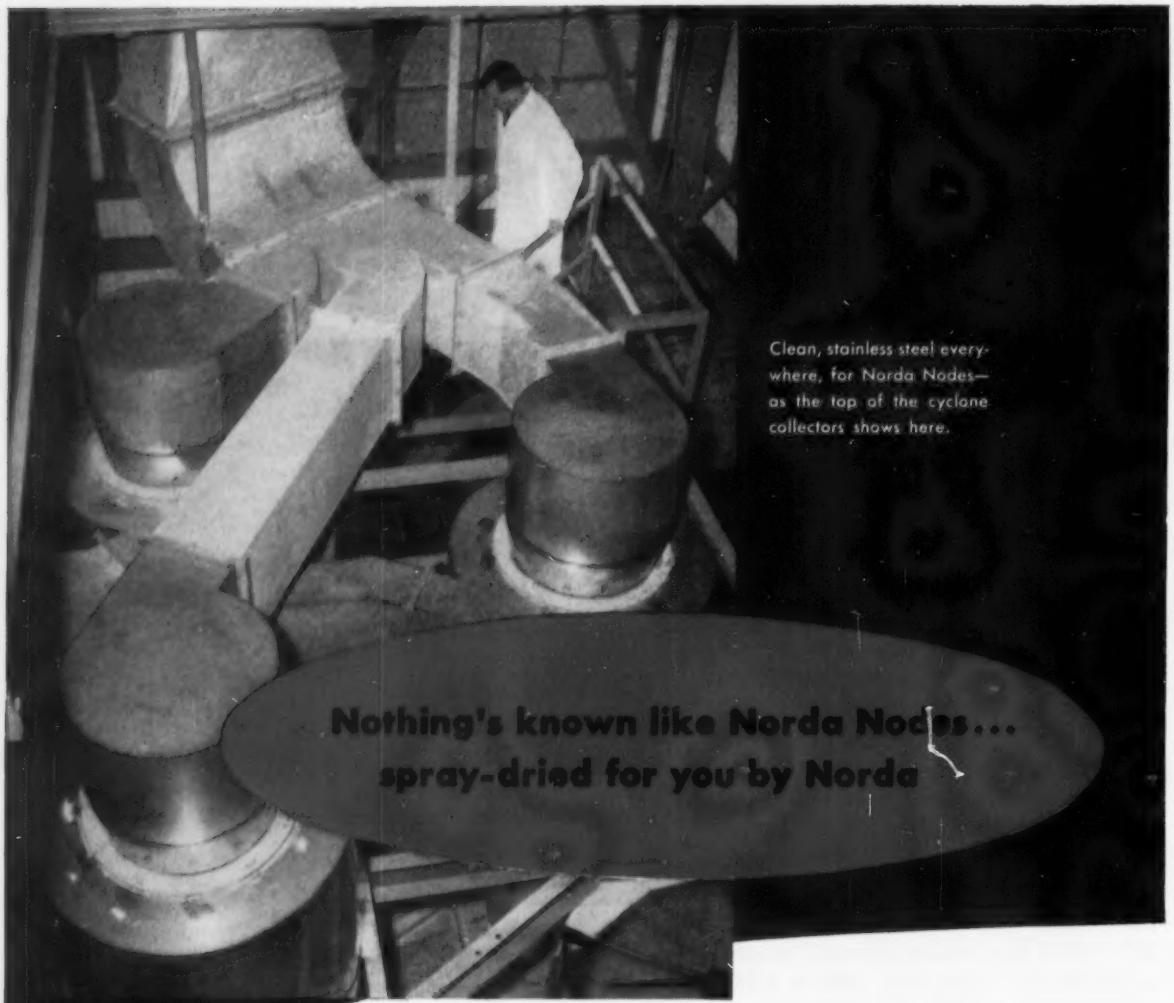

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ent in the beer. By modifying the test so that the amount of 0.001 indicator solution decolorized by 10 ml. of beer in exactly 20 sec. is determined, precision is greatly improved and quantity of reducing substances in the beer in microequivalents per liter (microvals) is obtained.

Beers with a Redox Titer (RT) of less than 10 microvals per l. are poor, 10-25 fair, 25-50 fairly good, and over 50, good. For control purposes in a single brewery, the time in seconds required for decolorization of 0.5 ml. of indicator solution by 10 ml. of beer may be measured and the RT calculated by simple proportion, provided the time is not far from 20 sec. Up to this time the time-volume curves are straight lines and pass through the origin.

This titration takes less than a minute, and permits examination of a large number of samples quickly. Natural beers have a RT range of 5-80. A RT of 80 is equivalent to 2.4 ml. of air per liter of beer (about 1 ml. per 12-oz. package).—*Internationaal Tijdschrift voor Brouwerij en Mouterij*, 161-78, 15 (9/10), and *Brauwissenschaft*, 70-72, March, 1956, 105-6, April, 1956.

Molecularly Modified Lard

Changing the normal crystallization habit of lard to improve its creaming and emulsifying properties is the object of a patented process. The lard is first refined in the liquid phase by treatment with diatomaceous earth and charcoal. It is then dried and reacted with sodium methoxide at a temperature of 120-200 F. for a period of 2-60 mins. This step in the process modifies the crystalline habit of the lard and gives it the desired properties.

After treatment the residual catalyst is killed and the small quantity of soap formed is hydrated by agitation with hot water, forming an emulsion. Latter is broken by holding for 1-2 min. at about 180 F. Spent catalyst and hydrated soap, or foots, are separated from the lard by centrifuging.

The modified lard is given a final wash with hot water, separated, vacuum-dried, and deodorized. Finished product has a water content of 0.05% or less by weight.—U.S. Patent 2,751,304, June 19, 1956.

Margarine by New Process Closely Resembles Butter

With both brittleness and spreadibility practically indistinguishable from butter, a new margarine product is said

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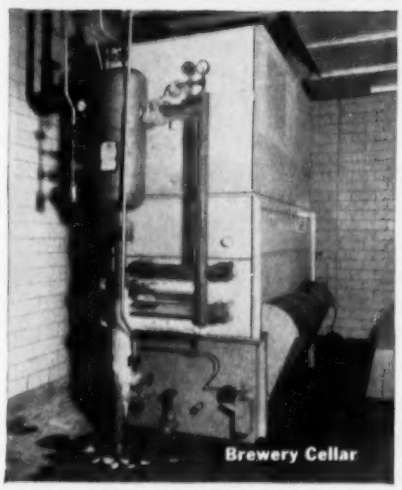
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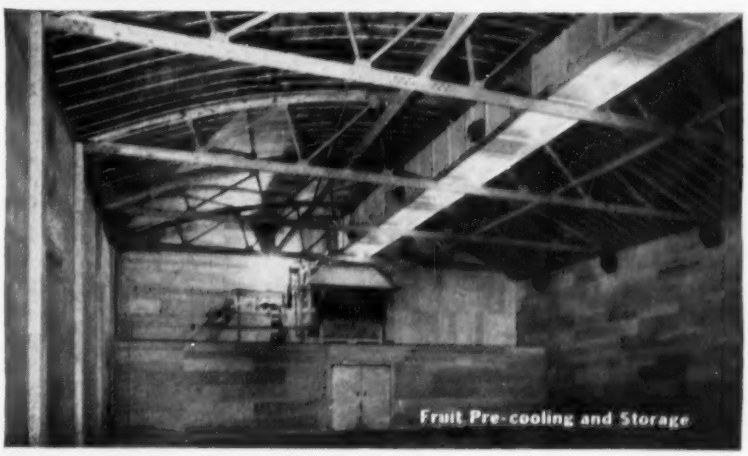
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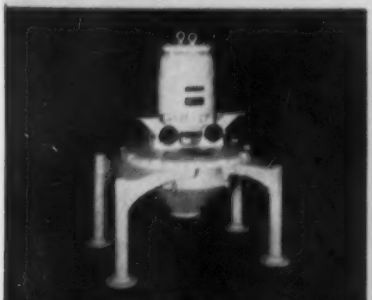

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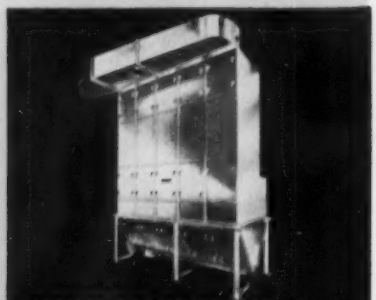

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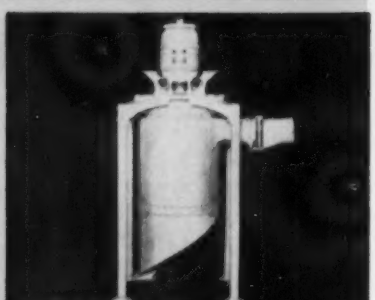

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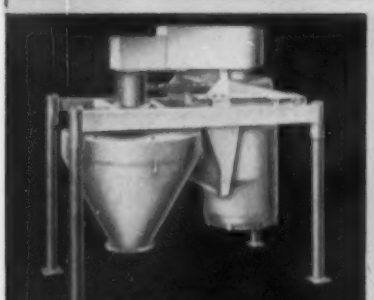

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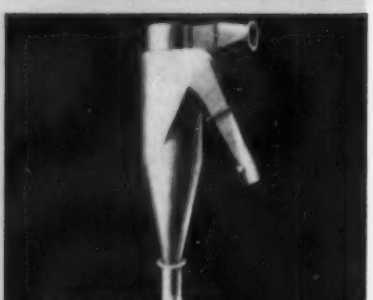

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to closely resemble butter in general appearance and flavor.

The new product, made by a patented process, has a somewhat coarser texture than conventional margarine. It has grainy structure, and improved feel on the palate, latter being measured by its capillary slip melting point, which is several deg. C. lower than that of margarine made by conventional methods.

Prime feature of the process is cooling of initial stream of stock by admixing it with a continuous stream of recycled and supercooled material. An emulsion of the fat and part of the aqueous ingredients is subjected to mild cooling and agitation in order to precrystallize the high-melting glycerides.

On leaving the precrystallizing unit the stream is subjected to rapid chilling and agitation in a Votator. Then, part of this material is recycled and admixed with the initial stream in order to cool it.

Remainder of the supercooled material is blended with balance of cooled aqueous ingredients, and resulting mix is subjected to screening, printing, and wrapping.

Tests of the new product and butter show that the former compares favorably with the latter in macropenetration, and stability in storage at 50 F. —U.S. Patent 2,745,750, May 15, 1956.

Freeze Drying Procedure Retains Meats' Freshness

Using a modification of the vacuum contact-plate drying technique, dehydrated meat slices about 1 in. thick have been prepared which reconstitute quickly and give a cooked texture, appearance, and flavor similar to those of fresh meat.

Crux of the procedure is partial freezing of boneless joints by overnight storage at 15F. before cutting into slices which are then fully frozen by storage at the same temperature for a full day before dehydration.

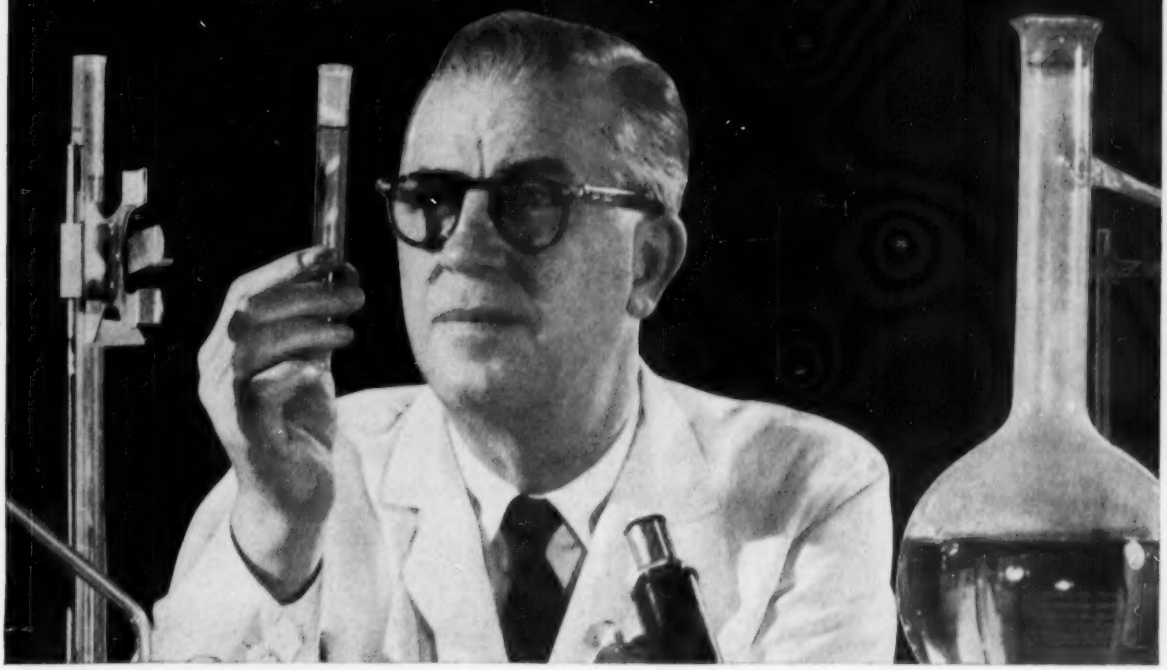
Vacuum contact-plate drying apparatus comprises a tight steel shell containing hollow horizontal steel plates heated by water. They can be moved together for intimate contact and good heat transfer.

Food to be dehydrated is placed in aluminum trays with lids and inserted between the drying plates. Dehydration proceeds under vacuum when hot water is circulated through the plates.

In the present experiment, frozen sliced mutton was loaded on trays and placed in the apparatus. After preliminary manipulation of vacuum and temperature, heating plates were grad-

Got a Processing Problem?

Think your processing could be better? More economical? Ask the men at Quaker Oats—they can find the answer!



What Quaker has done in the food processing field is a truly *amazing* story. A story that *should* be told in person.

Quaker, with years of experience in oats, corn and barley, recently added rice flour to the list. These flours have almost *unlimited* application in food processing. They are extremely neutral. Used as thickeners or carriers they assume characteristics of other ingredients—or characteristics can be accentuated or eliminated. You can have *any* size granulation—from the original grain to microscopic size. And all work is done under excellent temperature control. Yet these flours are very economical—save you money in processing.

Quaker's men and modern machines will work on *any* type of blended product. They insure you of highest quality. Quaker offers diversification of mills so all your eggs aren't in one basket. And Quaker is equipped to handle bulk—still another saving for you.

Quaker's resources and abilities in the processing field have only been touched upon here. The possibilities are endless. Let us help you as we have already helped so many major food companies. If you have *any* processing problem, call or write Industrial Food Sales, The Quaker Oats Company. No matter *what* the problem, it will be worth your while.

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Yeast requires sensitive drying methods. This Proctor installation at National Yeast Company maintains the uniform quality, color, and viability of the yeast at considerably increased drying rates.

Uniform product quality can be obtained only through flexible, sensitive drying methods. Proctor equipment provides the construction features and controls necessary to achieve uniform drying. Many materials heretofore considered unsuitable for conveyor drying can now be handled with speed and efficiency by means of Proctor pre-forming techniques. And, as always, Proctor equipment carries performance guarantees based on wide experience and careful analysis of the requirements. Write for complete information. Ask for bulletin #410.

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Tray Dryers
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Manufacturers of Industrial Drying Equipment and Textile Machinery

Proctor

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ually raised to 80 F. and closed to make contact with meat.

After 130 min. heating plates were quickly raised to 195 F., thawing the meat and causing a rapid evolution of vapor. This temperature was maintained for 95 min., then water was gradually cooled until both meat and water were at about 140 F.

Vacuum was ½ mm. Hg. Percentage moisture in dehydrated mutton varied from 1.5 to 4.4%, and was reconstituted in from 3-30 min.—*Food*, 199-205, June 1956.

Quick Moisture Test

High frequency heating of cereal samples permits a determination of moisture in about 15 min., with good precision and accuracy within 0.15% of the much longer oven method.

The sample (3g.) is weighed into a porcelain crucible and placed on the lower of two metal electrodes. Upper electrode (of perforated metal to permit escape of moisture vapor) is brought down to rim of crucible or close to it. An 80,000 kc. alternating electric field is applied between the plates by a small generator (50w.) for 15 min. after which crucible is removed, cooled and weighed.

When tried on wet starch milling products, the method gave results equalling the oven method in precision, except on syrups and other high sugar products. These tend to swell, carmelize, and char in the high frequency field—method was also found unsatisfactory for coarse products high in moisture, such as steeped corn.—*Revue des Fermentations et des Industries Alimentaires*, 11, 2, 106-10, 1956.

Puffed Cereals

In the manufacture of a patented cereal food, the grain is first cooked with suitable flavoring ingredients in a pressure cooker.

It is then dried to 22-27% moisture tempered and passed through rolls which form lattice-like sheets.

Two such networks are formed in adjacent sets of rolls, and the sheets are deposited one on top of the other as they discharge onto a belt conveyor. They are carried forward to a slitter which cuts the double sheet into ¾ in. ribbons. These pass through forming rolls that produce hollow, pillow-shaped bodies which are dried to about 8-15% moisture then puffed in an oven at a temperature of 450-550 deg. F. for 1-2 min. Puffed bodies are toasted brown, cooled, and packed.—U.S. Patent, 2,743,685, May 1, 1956.

At last! Positive way to SOLVE INSTABILITY of food emulsions --7 MONTHS OR MORE!

KELCOLOID hydrophilic colloid

lengthens shelf life of French and Salad dressings, meat and barbecue sauces

You produce stable and uniform emulsions of superior flavor release and natural color with Kelcoloid. This easy-to-use hydrophilic emulsifying colloid improves consistency, gives smoother textured dressings of higher gloss.

for French dressings:

Extensively used in French dressings, Kelcoloid gives greater emulsion stability and markedly increases shelf life. Even when dressings are subjected to either high transit and storage temperatures, or refrigeration, Kelcoloid protects against body breakdown and separation.

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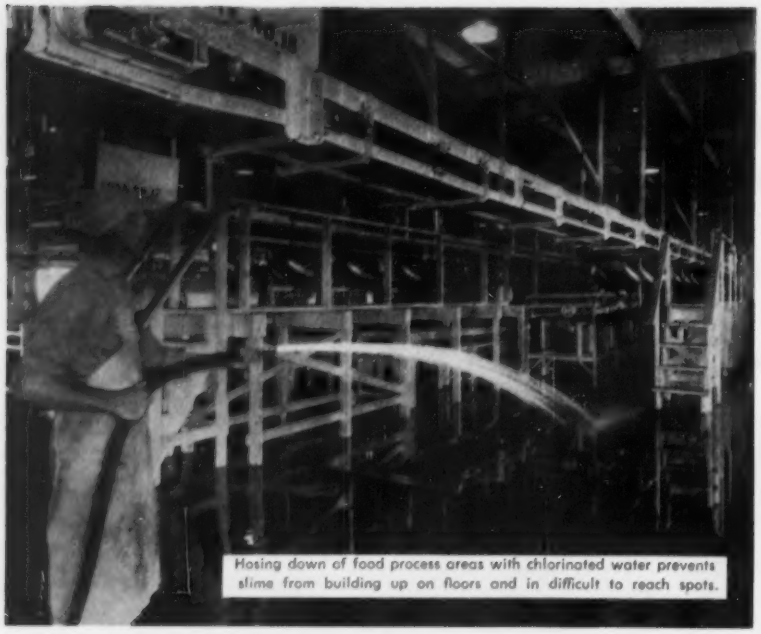

Hosing down of food process areas with chlorinated water prevents slime from building up on floors and in difficult to reach spots.

HOW W&T IN-PLANT CHLORINATION

cuts clean-up time and keeps plant cleaner

At a large eastern quick-freezing plant, slime accumulation on processing floors was a problem. It was necessary to halt production runs frequently for clean-ups.

Wallace and Tiernan Chlorinators were installed on the plant water system and all water in the plant is now chlorinated. Besides eliminating slime on processing floors and equipment, In-Plant Chlorination helps to maintain a higher level of plant sanitation with greater ease. Clean-up times have been reduced as much as 50%. Floors are no longer slippery from slime and accidents from this source have been virtually eliminated.

For information about W&T In-Plant Chlorination send for Bulletin #I-58.

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Write for Bulletin No. M-32

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M-32

Cut Accident Costs

—*Continued from page 42*

Journal. And his statement invites recognition and acceptance by management of the obscure motivations in individual injuries and in the injury-productive situation on the job.

Only that "safety education" which is based on an understanding of the human element helps prevent accidents, both on and off the job.

Aims of the Safety Program

The major purpose is not merely to instill a sense of duty to obey safety rules and regulations. Rather, the aim should be to encourage employees to be wholeheartedly on the side of responsible, safe behavior. Here, management will find a strong asset. For it is a basic desire of all sane individuals to behave as matured well-balanced persons.

The approach of the well-balanced person is mature and realistic, while the less mature and less stable person may distort the real situation in the face of danger, and react to it in an emotional, seemingly meaningless, way. The less stable the individual, the more likely he is to do the inappropriate and the foolish thing.

Program Slant

Consequently, he is much more in line for accidents in the injury-provoking situation than his more stable counterpart. And it is because of this that safety programs and campaigns must be directed primarily to the *immature, unstable worker*.

To do this, it is necessary to employ broad principles of mental health.

With emotionally healthy people, the directive method, in reasonable doses, is fairly effective. However, this approach may become dangerous with the maladjusted and less mature employees at whom, primarily, the campaign should be aimed.

Safety-Program Don'ts

The safety trainer, says Doctor McLean, must handle it carefully. For him to say that "society demands that we follow safety regulations, and this is a good thing to do"—certainly doesn't solve it.

Neither should he say that the individual who does not follow safety regulations is a social outcast. For in the face of such an attack on the problem, the immature individual is apt to respond with the opposite pattern of behavior to that which is sought.

End (*Resume reading on page 43*)

The New Sizes You've Been Asking For!

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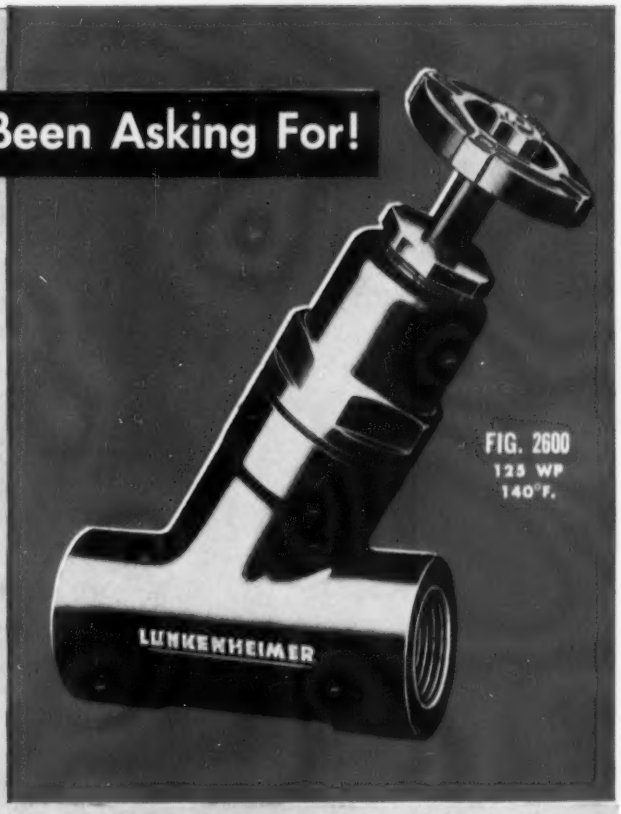

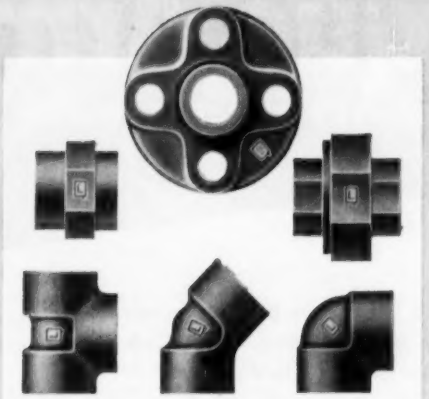

The first all-molded PVC Valve for corrosive fluids is now available in a complete range of sizes, including ½", ¾", 1", 1½", and 2" . . . each with a full line of fittings.

Since its introduction, the Luncor PVC Valve has proved so popular for corrosive service that demand for new sizes has continued to mount. Now you can take advantage of its proved-in-service superiority for many more applications!

The Luncor PVC Valve handles nearly all common corrosive solutions. It replaces expensive high-alloy or glass-lined valves . . . resists chemical action, aging, outdoor weathering, and is a non-conductor of electricity. It weighs half as much as aluminum—one-sixth as much as bronze—has a strength-weight ratio among the highest of all construction materials. Its great strength provides rigidity comparable to metal . . . so the Luncor PVC Valve is built to *close* tight and *stay* tight. Every part of the valve is molded from corrosion-resistant polyvinyl chloride . . . body, bonnet, disc, stem, and handwheel. Packing is self-lubricating Teflon.

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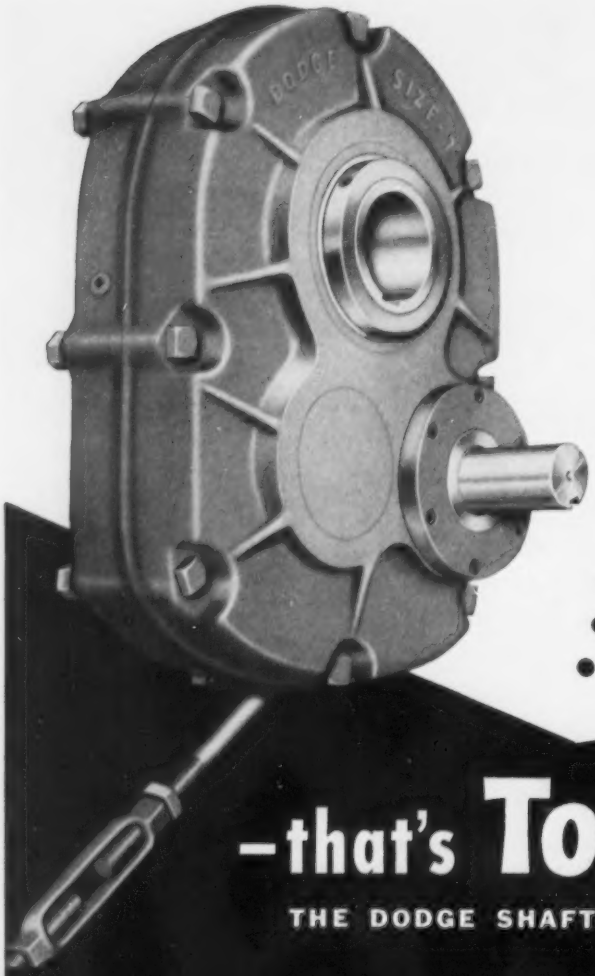

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Questions & Answers

THIS MONTH'S PROBLEM

Bags Break, Lose Product

Question—We're packing a granular, free-flowing product in a bag within a carton. But we're running into complaints. Some of the bags break and product sifts out of the carton. Can you trace the source of our trouble?

JULY PROBLEM

Testing Glass Pipelines

Question—We are considering installing a glass pipeline for one of our products to gain practical experience with this type of construction. Plans are to put it near a number of stainless steel pipelines of take-down construction, so that we can get a good comparison.

Some of our people are rather skeptical about the use of glass. However, we understand that it is quite strong, and will give good service if properly installed. Can you offer any installation suggestions?

Answer—From suppliers of this material, we understand that it is desirable to make up an isometric drawing so you can estimate required pipe and fittings. Allow ⅛ in. for thickness of gasket at each interface. Also use right-angled bends or slip-joints to give flexibility to glass pipeline.

It is, of course, good practice to keep the pipeline as near walls or ceiling as possible. Pipe supports on horizontal runs should be well spaced from elbows leading from fixed vertical runs—again, to provide flexibility. Supports should not be too long, to avoid swaying. And they should be provided separately for such heavy parts, as valves, so that the glassline will not have to support their weight.

Recommended pitch for pipelines is at least ¼ in. per 10-ft. length.

Since you mention that take-down metal pipelines will be nearby, we suggest the added precaution of metal guards at any points where there may be danger of striking the glass parts with metal ones.

Curbs Refrigeration Loss

Seems that the water section of the operator's condenser—in your April problem on losing refrigeration—has become fouled from rust or scale. This added thickness could reduce the rate of heat transfer from gas to water—in turn, causing higher pressures that reduce compressor capacity.

Where the condenser has a pressure-type water-control valve, the higher pressure will allow entry of more water. Whereas if it is a hand-operated valve, condenser would require more water in order to condense ammonia gas as efficiently as when equipment was first installed.

To overcome this problem, it would be necessary to clean the water section (tubes) of the condenser. If the tubes are accessible, all that is necessary is to brush or ream them. There are cleaners or solvents on the market for this purpose, but a wire brush or cleaning reamer would be more satisfactory, if practical, for this particular installation.

It is possible that the condenser may contain air and be in need of bleeding. Or maybe is is partly filled with liquid ammonia due to an overcharge. Both would reduce condenser efficiency since its entire surface is then not being used for condensing the gas. Reduced efficiency again causes higher operating pressure, which increases amount of water required.—*Francis P. Zepp. Ass't. Mgr., Fountain City Coop. Creamery Assn., Fountain City, Wis.*

Starch-Cooking Problem

Question—We have been trying to produce a pie filling by cooking starch with about seven times its weight of sugar. Although we have been very careful to control the time and temperature of the cooking opera-

HOW TO DO IT?

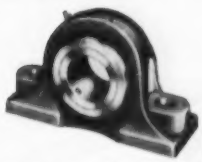
Readers are invited to submit to FOOD ENGINEERING answers to question. "This Month's Problem." Selected answers will be published with credit (unless you specify otherwise). We pay space rates.

JUST ASK US

Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

Write to Questions & Answers Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.

DODGE PRODUCTS you should know



SC and SCM
BALL BEARING
PILLOW BLOCKS

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DODGE TAKE-UPS

DODGE BULLETINS YOU SHOULD HAVE

1 ROLLING BEARINGS. Load ratings, dimensions and other data on Dodge-Timken and SC and SCM Ball Bearings. Bulletin A638.

1 TAPER-LOCK STEEL CONVEYOR PULLEYS. Construction details, sizes, dimensions. Bulletin D56.

1 DODGE TAKE-UPS. Roller Bearing, Ball Bearing, Babbitted. Bulletin D56.

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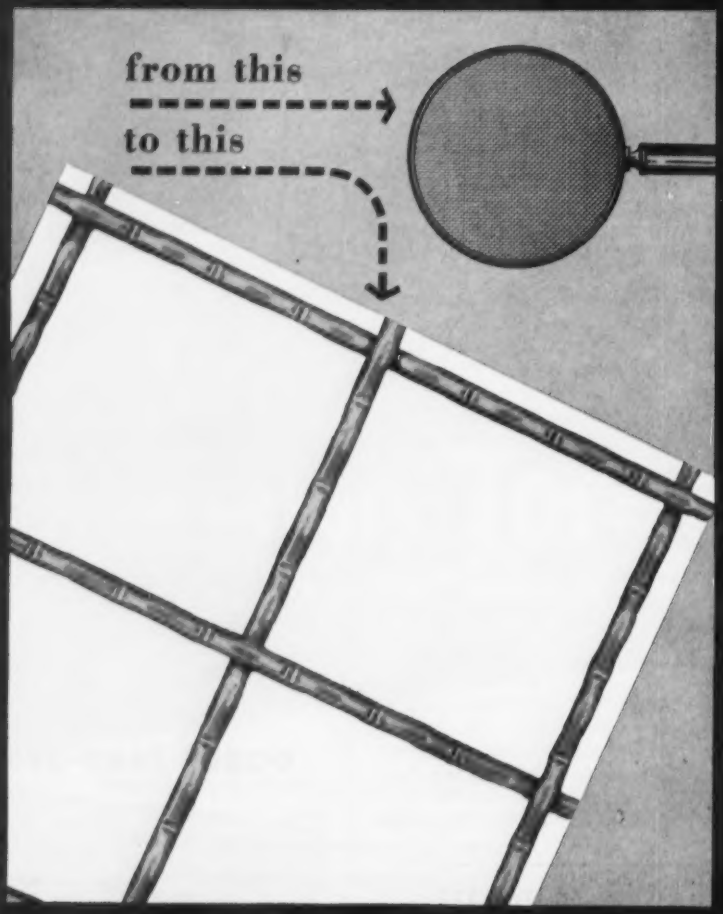

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tion, we have had very disappointing results. The cold starch jelly is dull, mushy, and thin, whereas we want a jelly that is clear, glossy, creamy and heavy-bodied. Can you suggest what we may be doing wrong?

Answer—You are right in mentioning that the time and temperature of cooking should be carefully controlled in working with starch jellies. Apparently, what you have failed to consider is that the presence of certain other products with starch granules during the cooking exert a retarding effect upon gelatinization.

In your case, use of 7 lb. of sugar per pound of starch is doubtless preventing the complete gelatinization of the starch under your conditions of time and temperature. In fact, even if you try extending the cooking time, this inhibiting effect will still be noticeable.

What we suggest (based upon recommendations of starch makers) is that you cook your starch with only 3 lb. of sugar per pound of starch. This mixture will permit complete gelatinization of the starch granules. The balance of the required sugar can then be added, taking precautions not to break down the jelly structure in the mixing.

Q.—What's a good, easy way of preventing adverse color changes—a gray-to-brown—in the lean portion of fresh pork sausage?

A.—Best way we know of hasn't met with approval of the Meat Inspection Division of the USDA. Yet, it is acceptable by some local food and health authorities. Method involves mixing ½ oz. of ascorbic acid and ½ oz. of sodium citrate in 100 lb. of sausage meat.

Canning Baby Limas

Question—We can a variety of beans. About the only exception is baby lima beans. Can you furnish us with information on the preparation of this item?

Answer—Actually, a two-step operation is involved—preparing the sauce and then the beans.

For the sauce:

In a suitable kettle, bring to a boil 200 gal. of water. Add, with constant agitation until dissolved, 36 lb. of salt, 24 lb. of sugar, and ¾ oz. of ground white pepper. Then gravity-feed sauce into hopper of filling machine (keeping it hot).

Now for the beans:

Soak dry beans for 1 hr. in warm water, and then for about 10 hr. in

DOW PROPYLENE GLYCOL, U. S. P.

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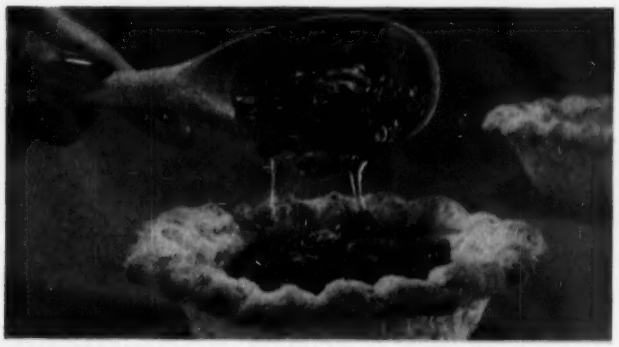

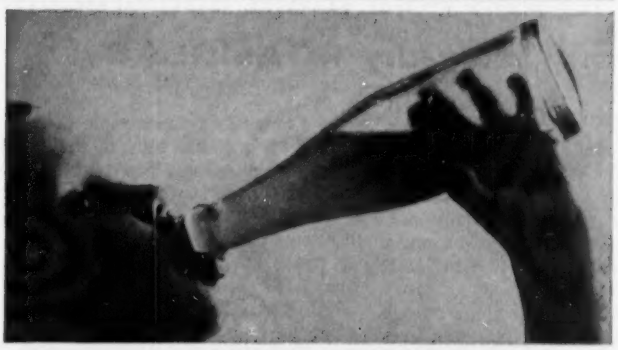

. . . offering higher solvent efficiency over a broad range of flavoring and coloring materials

Improving flavors for tasty baked goods or soft drinks, even orange ice—these are all tasks regularly assigned to Dow propylene glycol, U.S.P.

This highly effective solvent has become an accepted standard for flavors, extracts and flavor concentrates. Many makers of food colors, too, have replaced other solvents with propylene glycol—with remarkable savings and only minor changes in formulation.

The dependable quality and prompt delivery of Dow propylene glycol, U.S.P., can also simplify your production and scheduling. Evaluate it soon in your own laboratory. Write for a free sample and property information to THE DOW CHEMICAL COMPANY, Midland, Michigan, Dept. OC 810E-2.

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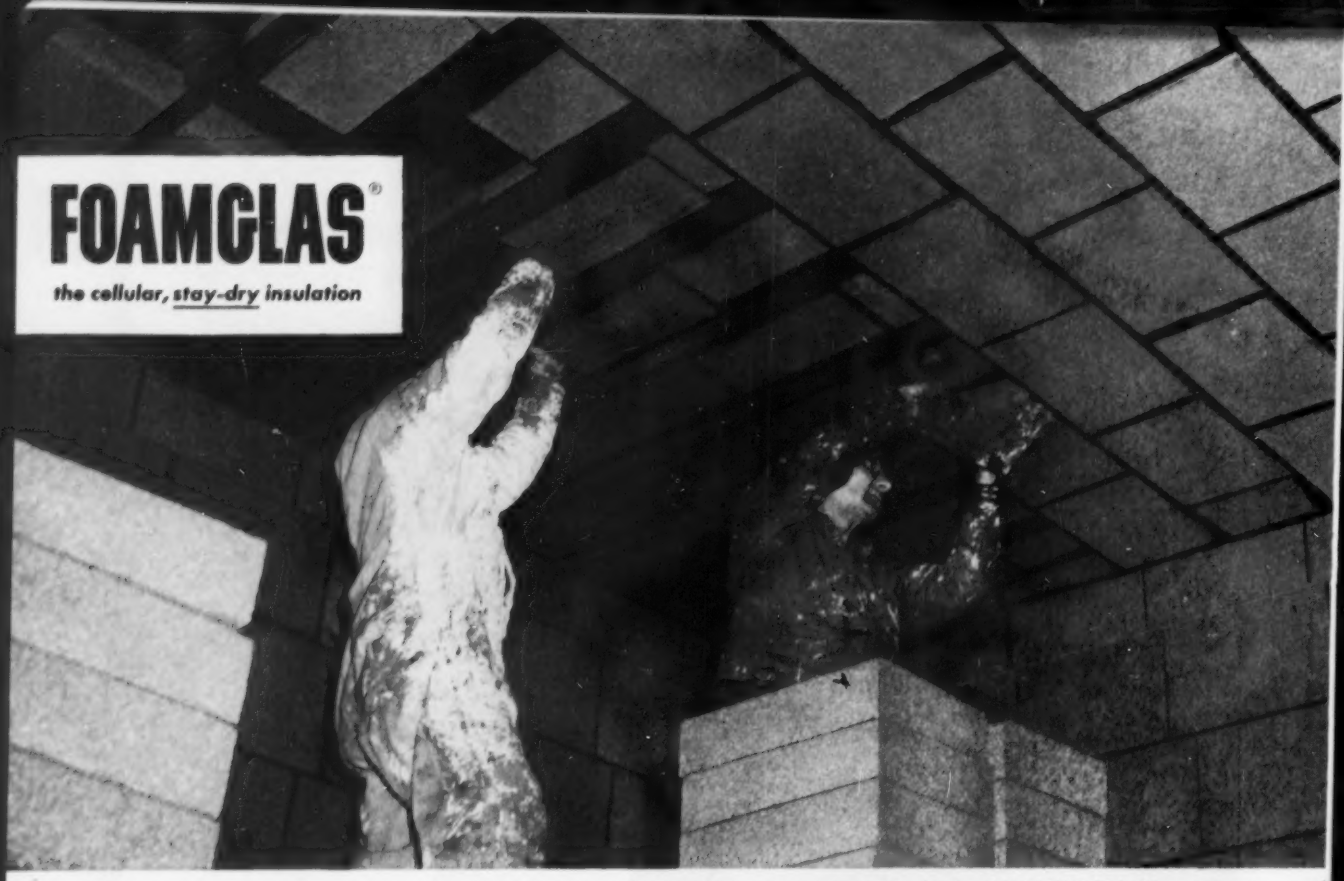

Workmen are installing lightweight, dimensionally stable blocks of 4" FOAMGLAS in T-iron ceiling of new Welch Grape Juice freezer. Free-standing walls of FOAMGLAS—which help support the ceiling—require no extra structural support because of the insulation's unusual strength and rigidity.

Welch Grape Juice saves 10% on cold room construction by insulating with strong, stay-dry FOAMGLAS

The Welch Grape Juice Company found a new money-saving technique to build freezers and coolers at plants in Brocton and Westfield, N.Y. FOAMGLAS with its unique combination of structural strength and constant insulating effectiveness, made this new technique practical.

According to Welch: "We saved valuable time and at least 10% on construction costs with our new type of low temperature enclosure for freezing and storing grape juice concentrates. Key to the design was our use of FOAMGLAS as both structural wall and insulation."

Each of the new Welch cold rooms is surrounded by an insulating envelope of FOAMGLAS. It's used in all walls without support from building structural members . . . in free-standing partitions . . . in pan and T-iron ceilings . . . and under all wearing floors. Moisture-proof FOAMGLAS is dimensionally stable, rigid and takes compressive loads of seven tons per square foot without crushing. Thus, it enabled Welch to eliminate the cost of masonry back-up or supporting studs. And separate vapor barriers were unnecessary.

This completely inorganic cellular glass material provides virtually permanent insulating effectiveness, too. As Welch concludes, "Since FOAMGLAS is moisture-proof, its efficiency doesn't fade. That keeps down the load on our refrigeration equipment. Operating costs are held at a constant low level. In fact, our refrigerating requirements for these cold rooms should be no higher in ten years than they are today."

See for yourself how *you* can benefit when you insulate with FOAMGLAS. Send today for a free sample and directions for six easy tests to perform in your own office. You'll prove that FOAMGLAS is *your* ideal insulation! Write . . .

Pittsburgh Corning Corporation

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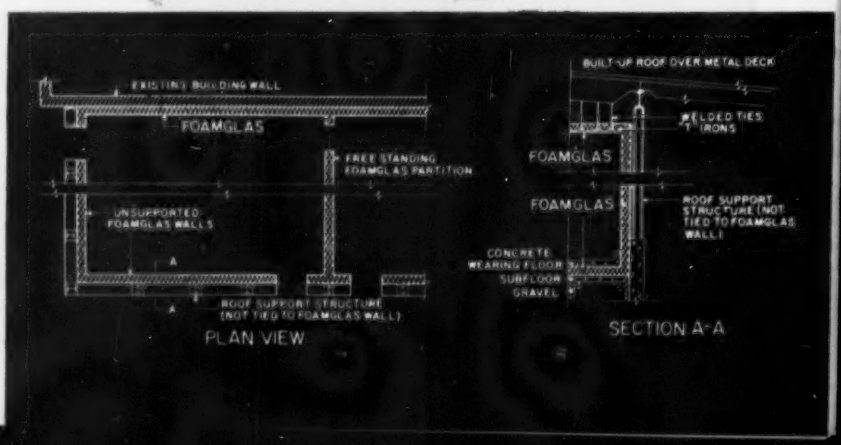

Detail showing use of FOAMGLAS in walls, free-standing partitions, ceiling and floor of new Welch Grape Juice freezer. Note section showing how FOAMGLAS stands free of structural supports for roof.

cold water from the tap. Blanch beans 5-7 min., and then run them through a stoner, onto an inspection table, and into the filling machine hopper.

Beans and sauce are filled into cans, capped, and sealed. Ratio is 8.75 oz. of beans to 7.37 oz. of sauce in 16-oz. cans, and 15.60 oz. of beans to 13.00 oz. of sauce in 28-oz. cans.

The 16-oz. cans are heat-processed in retorts for ¾ hr. at 240F., the 28-oz. cans at the same temperature for 85 min.

Combustion Safeguards

Question—We are thinking of converting our present coal-fired boilers to gas, and are concerned about providing adequate combustion safeguards. We believe there are several different types, but find the terminology somewhat confusing. Can you explain what they are and how they work?

Answer—Simplest safeguard applied to a gas-burning installation is a pressure switch in the fuel-supply line. It is set so that if there is a sufficient drop in gas pressure for any reason, the switch operates to close the gas-supply line. The valve must be of the manual re-set type, so that it will not automatically reopen and admit gas to the furnace under unsafe combustion conditions.

Another set of safeguards is based on the principle of using heat from the flame itself. These include bimetal strips, thermocouples, or radiant heat detectors to determine when a flame is present, and to operate the fuel shut-off valve in event of flame failure. It should be recognized, however, that devices depending upon heat alone might have an undesirable lag.

Still other devices uses properties of the flame itself. For example, a flame conducts electric current and thus can be made part of a circuit. Flame failure is detected electrically, amplified electronically, and made to shut off the fuel with little or no time lag.

Also, a flame can rectify a current

Q.–How are frozen, breaded and boneless pork or veal chops prepared?

A.–Cut boneless pork or veal into small chunks and thoroughly mix to uniformly distribute lean and fat. Grind meat through ¼-in. plate, and mold 3-oz. portions with Hollymatic machine, using ⅜-in. slide plate (chop shape). Then run through automatic egg batter and breading machines, and freeze.–Hollymatic Corp., Chicago.

• THINNESSES TO .002".
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Whatever the conveying problem might be—whether it involves the handling of cartons, cases or bags—**Mathews** builds the equipment to do the job. You can be sure of this service, from proposal through installation, when you buy **Mathews Conveyers.** And, of course, you get the benefit of over **fifty years' experience** in continuous flow material handling.

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MATHEWS

—a principle used in certain "flame-rod" instruments which again can make use of electronic methods for quick response. Another type responds to radiation from the flame, having ingenious compensation for background effects of hot brickwork, etc.

But there is more to proper control than the combustion safeguard itself. It is very important to provide for purging, also a complete program for starting or re-starting combustion safely.

You'd be helped by inspecting the control system on a modern "package type" oil or gas-fired steam generator, since these have been carefully worked out for automatic operation. Your local gas utility should also be consulted for advice on safety and adequate controls.

Canning Sliced Beef

Question—In preparing cooked, sliced, top round beef for canning (retorting 90 min. at 240F.), to what degree must the meat be pre-cooked? And what machine should we use to slice it about an hour later?

Answer—It would be better to slice the meat prior to pre-cooking, rather than have the pre-cooked meat fall apart during slicing. To do this, use a rotary meat cutter. Some firms employ a modified bacon slicer to cut partially defrosted (26-28 F.) meats to obtain more attractive, clean-cut slices.

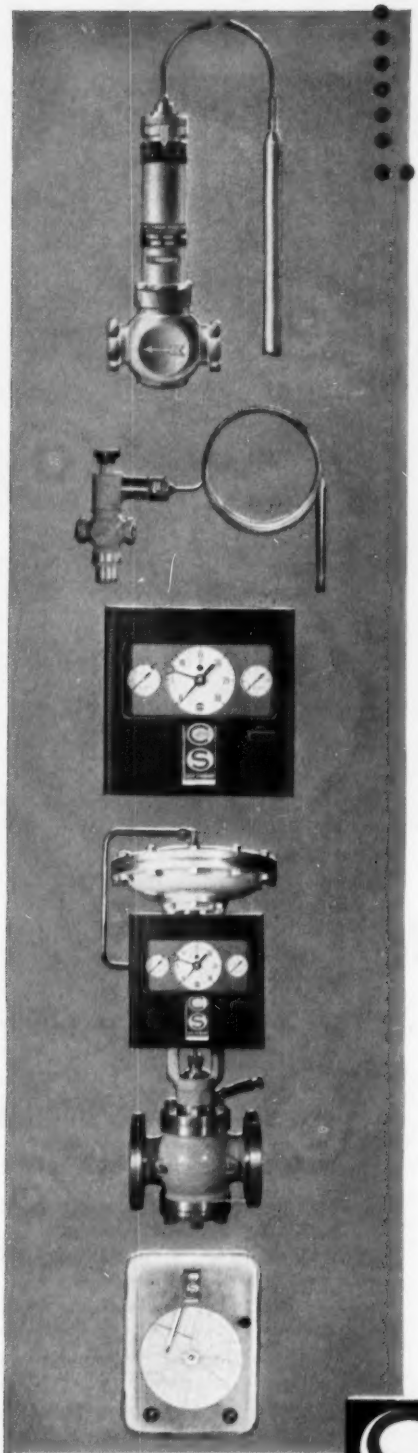
By degree of pre-cooking, we assume you mean to what extent the meat is cooked. If so, then shrink the beef during the pre-cooking (parboiling in a kettle of simmering broth or water, or braising without water) to about 65% of its raw weight. Parboiling or braising takes 30 min. or more, depending upon the meat and thickness of slices.

More on May Problem

On re-reading last month's comments on continuous manufacture of certain table-ready meats, some observations come to mind that may have supplemental value to information already published.

Incidentally, I heartily concur with the published answer, it agrees pretty well with procedures I have worked on, seen developed, and utilized in the meat field. Processes described are not "blue sky," for I've seen them in operation at various plants.

I believe it worthy to re-emphasize that procedures described are, at the moment, adaptable only to "spread" materials, which have no "structure" in finished products such as wieners



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Self Operating Temperature Regulators—

Feature a liquid filled thermal system for high operating power and uniform throttling action and has built-in over-load protection. Available in 50°F. and 100°F. ranges from 25° to 325°F. Direct and reverse acting units ¼" to 1½" with screwed ends, and 2" to 4" with flanged ends. Bulletin No. 500. (Cash Standard Stacon Corp.)

STACON TYPE VS
Temperature Safety Regulators—

Used in the supply steam or gas line and will protect a process by snapping shut when the process temperature goes above a desired temperature level. Easily adjustable and remains closed until manually reset. Available in sizes from ½" to 1½" with screwed ends. (Cash Standard Stacon Corp.)

CASH STANDARD TYPE 51
Indicating Controllers—

An air operated, mercury actuated proportional temperature controller. Temperature ranges from —40°F. to 1000°F. Calibrated set point adjustment, unit construction, air relay with sapphire orifice and push button cleaner, feedback type proportional control with 1-100% band and differential gap. Also available with 1-150% proportional band combined with automatic reset action. Bulletin No. 978. (A. W. Cash Co.)

CASH STANDARD TYPE 30
Diaphragm Control Valve (With Type 51 Mounted)

A rugged, dependable control valve—available in sizes ½" to 12" with various styles of inner valves—reverse or direct acting. Accurate control is assured when the Type 30 is used with 51 or 57 controllers, valve mounted as illustrated, or where the controller is installed remotely. Bulletin No. 980. (A. W. Cash Co.)

CASH STANDARD TYPE 57
Recording Controllers—

An air operated temperature controller with mercury, vapor, gas or organic liquid actuation. Temperature ranges from —350°F. to 1200°F. Available in 9" and 12" case size, spring or electric driven chart drive, on-off control or 1-100% proportional control.

All units have push button nozzle cleaner; proportional controllers also have sapphire jewelled relay orifice with push button cleaner. Bulletin No. 979. (A. W. Cash Co.)

WHAT'S *YOUR* TEMPERATURE CONTROL PROBLEM?

Cash Standard and Stacon have the answer or will find one.

Contact the Cash Standard temperature and pressure control specialist in your area, or write Dept. G.

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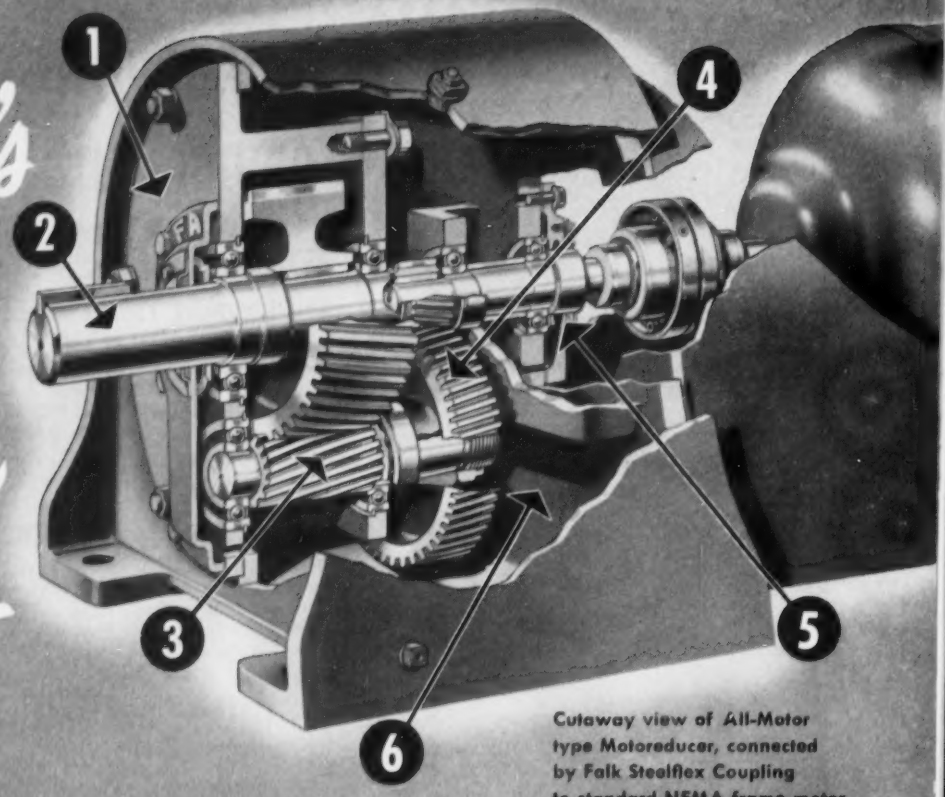
PRESSURE, HYDRAULIC, TEMPERATURE, PROCESS AND COMBUSTION CONTROLS

Here's the inside story—



Cutaway view of All-Motor type Motoreducer, connected by Falk Steelflex Coupling to standard NEMA frame motor

WHY Falk Motoreducers give better service—have longer life

Here is the "inside story" behind the all-steel All-Motor type FALK Motoreducer's universal reputation as a gear drive unmatched in quality, efficiency, dependability, ease of maintenance and long life. These "In-built" factors are—

1 **ALL-STEEL HOUSINGS.** Rugged, strong, rigid...all parts are manufactured from heavy steel plate, formed and welded in the Falk Weld Shop.

2 **LARGE OVERHUNG LOAD CAPACITY.** Large shafts, oversize bearings...rigid mountings with wide bearing spans to handle maximum applied loads.

3 **PRECISION GEARING.** Heat-treated alloy steel gearing, precision cut and shaved after heat treatment to eliminate distortion. Quiet, crown-shaved pinions.

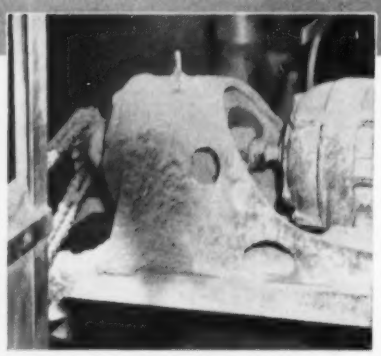
4 **EXTRA-CAPACITY GEARING.** Special extra-capacity gear-tooth form with larger contact area gives greater strength, higher load-carrying capacity.

5 **SEALED HOUSINGS.** Splashproof, dustproof, oil-tight construction. Dual closures and one-way vents keep oil in, dust and moisture out.

6 **POSITIVE LUBRICATION.** Large sump capacity...oiltight construction assures clean lubricant...revolving elements lubricated by direct dip.

When you buy or specify the All-Motor type FALK Motoreducer, you get all these—plus the tremendous advantage of full interchangeability of motors. Switch motors as desired—use any make, style or type of standard foot-mounted motor within the unit's AGMA rating—with a minimum of difficulty or "down time."

Available in sizes up to 75 hp—*with or without motor*—from convenient factory, field or distributor stocks, from coast to coast. **Write for Bulletin 3100.**



60,000 HOURS WITHOUT A FAILURE!

Sixty thousand hours is a lot of hours—but the FALK Motoreducer in the unretouched photo above has served that long without failure or need of repair.

This 3 hp unit is one of over 60 FALK Motoreducers in daily service in an Eastern plant of a large milling company, whose president says, in part:

"One of the main advantages of FALK Motoreducers is their adaptability to any motor. Reducers and motors can be easily interchanged....Our service records confirm the wisdom of our choice of FALK equipment as our standard."

FALK ...a good name in industry

THE FALK CORPORATION, MILWAUKEE, WISCONSIN

MANUFACTURERS OF

- Motoreducers
- Speed Reducers
- Flexible Couplings
- Shaft Mounted Drives
- High Speed Drives
- Special Gear Drives
- Single Helical Gears
- Herringbone Gears
- Marine Drives
- Steel Castings
- Weldments
- Contract Machining

or bologna. As such, the process is adaptable not only to liver spread and potted meats, but also to liver cheese, braunschweiger, and sandwich spreads.

Our experience with this production method also brought a few pleasant surprises. In addition to achieving better quality control and uniformity, we found that, where warm meats were comminuted and followed by Votator-pasteurization, the conventional stuffer could be bypassed. It was done by pump-stuffing from a collecting sump.

Kovac suggests a direct tie to a chub stuffer, which would be best for eliminating handling. At any rate, items produced by pump had remarkable keeping quality. Since there was no handling after Votator-heating, we had a pasteurized product which kept in saleable condition in a display case as long as three weeks.

Another economically important factor: In the traditional method of making braunschweiger, fat level must be carefully watched because the meat piece, during final cooking, hangs motionless in heating tank, and fat migrates through the mass to form a "fat cap." In the Votator process, meat is heated and agitated at the same time.

We went as high as 60% fat in our formulation (just for observation) and produced a product without "fat cap."

Someday, someone is going to base a continuous process for wieners, bologna, etc. on this work. It isn't necessarily easy, but it can be done with patience and imagination.—*Roy E. Morse, Professor, Department of Food Technology, Rutgers University, New Brunswick, N. J.*

Q.—Do you have a soy sauce formula?

A.—Blend the following: Hydrolyzed vegetable protein, 100 gal.; acid-proof sugar color, 38 gal.; corn syrup (43 deg. Bé.), 23 gal.; salt, 1,050 lb.; sodium benzoate, at rate of 0.1%; and water, sufficient to 860 gal. You can alter the formula by increasing the amount of protein hydrolysate and salt to suit taste and price. Corn syrup provides sweetness and viscosity.

Air-Contamination Query

Question—We generate our process steam with a horizontal return-tube boiler fired by pulverized coal. Until recently, we had no particular problem. But now a number of homes have been built on previously undeveloped land near our plant, and we are re-

UNITED'S BB (block-baked) CORKBOARD

United's Corkboard has been the choice of hundreds of cold storage operators over the last forty years. Inspection of many United Cork installations after 10 to 20 years service has shown the insulation to be as good as new—no deterioration—no loss in insulating effectiveness.

Whether you operate an ice cream plant, creamery, food processing company or cold storage warehouse you can't take chances with your insulation—it has to be right. If you have a low temperature insulation problem, specify United's Corkboard—it's time-tested on the job.

Retains initial low "K" factor
Easy to install
Works as easily as lumber
Lightweight and flexible
Structurally strong
Bonds readily with cement, hot or cold asphalt
Fire retardant; insect, vermin resistant

United Cork Companies have 50 years of experience and leadership in serving the requirements of the refrigeration industry. Use the coupon below for additional product information and installation data, your United representative will be glad to advise you.

Corkboard | Pipe Covering | Tank Lagging

UNITED BB CORKBOARD

UNITED CORK COMPANIES
2 Central Ave., Kearny, New Jersey

Manufacturers and erectors of cork insulation for almost a half century

Engineering and installation offices, or approved distributors, in key cities—coast to coast.

UNITED CORK COMPANIES, 2 Central Ave., Kearny, N.J.
Please send United Cork Catalog. I am interested in

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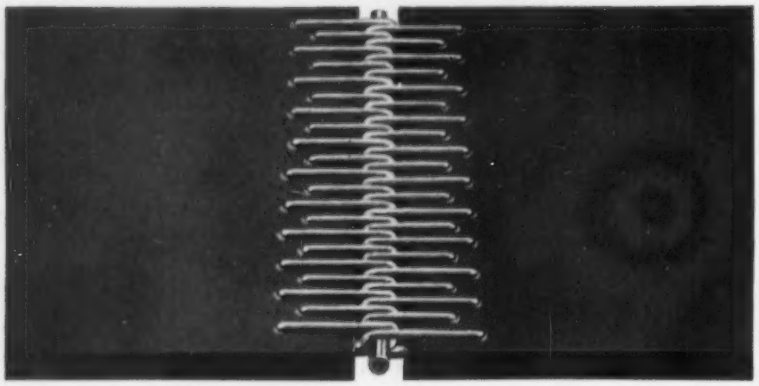
the fastest way to make ends meet



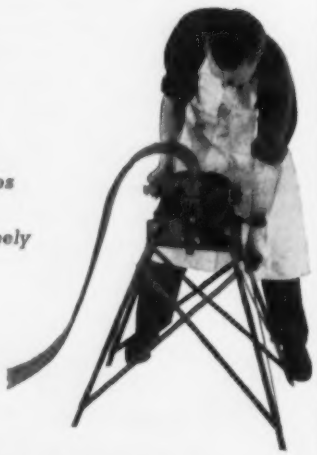
Clipper

HOOKS and LACERS

in materials handling, food harvesting and processing, power transmission, wherever flat ends must be joined.

Clipper belt lacing equipment for belts, aprons, tapes and ribbons!

- *produces secure, flexible joints in minutes*
- *does not injure belting*
- *gives smooth, flexible joint that rides freely over conveyor rollers*
- *is flexible both ways of the belt*



WRITE FOR FREE SAMPLE

Send a sample of your belting, apron or ribbon to Clipper with an outline of your problem. They'll determine the best method of fastening and then lace your sample FREE.

Ask your Industrial Distributor for Clipper Products

Clipper BELT LACER COMPANY

988 Front Ave., N. W., Grand Rapids 2, Michigan

ceiving numerous complaints from the residents about smoke, fly ash, and coal dust.

Can you help us by suggesting some simple and inexpensive measures we can take to reduce these complaints?

Answer—As long as you continue to use pulverized coal for fuel, you can expect to have fly ash. From the fact that you have an HTR boiler, we assume that it may not be a very large one, and we do not know whether a fly ash collector could be justified. It seems rather doubtful.

Usually, the chief complaints in such cases can be traced directly to the blowing of the tubes. And if your own experience bears this out, it would seem to be the logical point of attack.

One thing you can start doing at once at no additional cost, is to carefully watch the wind direction, blowing the tubes when the wind will carry the stack discharge products toward the area least densely settled. A large scale local map on which to mark sources of complaints, and a log book giving wind direction and time of tube blowing, should be helpful during this period.

Another temporary measure might be used, but only if justified by local conditions. If there are other sources of atmospheric contamination beside your plant, and you have reason to believe that you are being unjustly criticized simply because the townspeople see your stack during blowing operations, you might occasionally blow your tubes at night.

One of the most satisfactory corrective measures will cost you a few hundred dollars but will probably prove well worth it. It is to install an industrial vacuum cleaner (with suitable hoses and attachments) in or adjacent to your boiler room. This can be used to collect soot and fly ash from the tubes, instead of blowing them up the stack. Such a unit may employ a 5 to 10 hp. motor, but will occupy little floor space.

Q.—Any suggestions on how we can check rancidity traceable to nuts in our dime candy bars?

A.—You might try coating the nuts with a high-melting-point vegetable oil before incorporating them into your formula.

An additional benefit can be realized from such equipment: It can be used to keep the boiler room much cleaner and freer from coal dust, which will make for more sanitary conditions in your food processing plant.

As to complaints of coal dust, these probably originate with your outdoor coal-storage pile and coal-unloading

Yours FREE! TECHNICAL LITERATURE

1. VALVE TECHNICAL DATA . . . Twelve page technical manual giving design, selection, maintenance and repair data for stainess steel valves.

2. GETTING THE MOST OUT OF YOUR VALVES . . . Four page technical discussion explaining selection, installation, inspection and maintenance of stainless steel valves.

3. CATALOG 55D (VALVES) . . . Sixty-eight page simplified stainless steel valve catalog includes engineering drawings, weights, size ranges, dimensions and basic material data.

4. CATALOG 55F (FITTINGS) . . Complete stainless steel fitting catalog giving engineering drawings, dimensions and basic material data.

5. VALVES TO COMBAT CORROSION . . . 75 questions and answers selected from Cooper Alloy valve clinics covering materials, operations, service problems, installation and repair.

6. STAINLESS STEEL VALVES AND FITTINGS IN THE PAPER INDUSTRY . . . Eight page technical article covering alloys, valve selection, design factors, installation, maintenance, operation and inspection of stainless steel valves and fittings used by the paper industry.

7. PLASTIC PUMPS . . . Four page folder describing the Vanton "Flex-i-Liner" pump. Full and cut-a-way views, plus performance charts and material selection hints are included.

8. PLASTIC PIPE AND FITTINGS . . . 8 page catalog on Vanton P-Line (PVC), N-Line (Buna N) and S-Line (Styrene) pipe, valves and fittings.

9. PUMPING CORROSIVES . . . Four page article describing the transfer of hydrochloric, formic, lactic acid and salt solutions at Litho Chemical.

10. ADVANCED KNOW-HOW . . . Series of case studies showing how advanced know-how made possible the economical production of high alloy products considered difficult or impossible to cast.

11. MATERIALS SELECTION CHART . . . Four page chart designed to assist in the selection of the most economical alloy for a given corrosive problem. More than 350 specific corrosives are included.

12. DESIGN CONFERENCE . . . Special edition of Newcast containing the technical papers presented at the Cooper Alloy Design Conferences. Subjects incude Casting Design, Shell Molding, Cast Weld and New Materials.

13. ALLOY REFERENCE CHART . . . Revised four page pamphlet listing alloy designations, applications, properties and analysis of corrosion and heat resisting alloys.

14. STAINLESS STEEL CASTINGS ON PARADE . . . Four page folder presenting a variety of cast parts with information as to alloy, weight, application. Complete data chart listing twenty-eight alloys with recommendations for their use is included.

15. NEWSCAST . . . An eight page bi-monthly publication devoted to reporting technical material of value to those interested in corrosion resistant castings, fittings, valves and pumps.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

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CORPORATION • HILLSIDE, N. J.

FOUNDRY PRODUCTS DIVISION · VALVE & FITTING DIVISION · VANTON PUMP & EQUIPMENT CORP.
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Company _____

Address _____

City _____ Zone _____ State _____

For more data, circle this page number on card at front → 183

another big ACRONIZED* ad hits the newsstands

Every poultry buyer you sell to is going to feel the consumer pressure from this full page, full-color ad promoting Acronized chicken in Life, Ladies' Home Journal, and Good Housekeeping.

And the pressure is going to increase... because this is a *continuing* campaign, the greatest in the history of the industry.

There's only one way to have this powerful advertising campaign work for you—*qualify at once for the franchise to process Acronized poultry.*

Consumers want Acronized poultry because it is *consistently* fresh and tasty. Retailers want it for its *operational* economies. But only you can supply it, because Acronized poultry is sold only through franchised processors.

To learn how your plant may qualify, write:

CYANAMID

AMERICAN CYANAMID COMPANY
Food Industry Department, 30 Rockefeller Plaza, New York 20, N.Y.

NOW IS THE TIME TO STANDARDIZE ON ACRONIZED* POULTRY!

*Registered U.S. Pat. Off. AMERICAN CYANAMID COMPANY

operations. It is almost impossible to eliminate all dust. But you will find that if you spray the coal cars and coal pile with water containing a wetting agent, you'll minimize the dust problem.

Some plants have converted from coal- to oil-firing in an attempt to improve their community relations, but this should not be undertaken hastily. For one thing, oil-burning equipment can also produce soot. For another, the economics may be very unfavorable.

Also, if you process perishables, you will have much more of a problem assuring uninterrupted supplies of fuel in event of strikes or transportation difficulties, since the cost of large reserve storage facilities would probably be prohibitive.

Tips on Steam Costs

Question—We have recently been checking on some of our overhead expenses, in order to reduce costs as much as possible in the face of competition. One is the cost of steam generated in our own boiler house. Several opinions exist as to the cost of steam, and how it might be further reduced. Can you give us some information on how to compute steam costs and any tips on how to keep them to a minimum?

Answer—There is probably no question concerning the necessity of including fuel costs and wages of your boiler-house crew in computing steam costs. These are most obvious. However, there are other costs which must also be included for accuracy.

A convenient way to look at the matter is to consider just what costs are now incurred that could be eliminated if you were purchasing steam. You would include depreciation (or rental) on boiler house and on boiler-house equipment; maintenance on building and equipment; taxes on both; insurance (including liability); cost of unloading, stockpiling, and handling coal; charges for ash and cinder disposal; and even the cost of electric power, water, and treatment chemicals used in generation of steam.

One of your first tasks will be to

Q.–How would I go about making a general purpose seasoning salt?

A.–Blend the following ingredients on a percentage basis: Salt, 75.0; sugar, 17.0; monosodium glutamate, 5.0; onion powder, 1.0; celery seasoning, 0.4; pepper, 0.5; thyme, 0.2; sage, 0.5; dill, 0.1; and garlic powder, 0.3. –Formula by Patricia Kearns, Technical Service Dept., The Huron Milling Co., Royal Oak, Mich.

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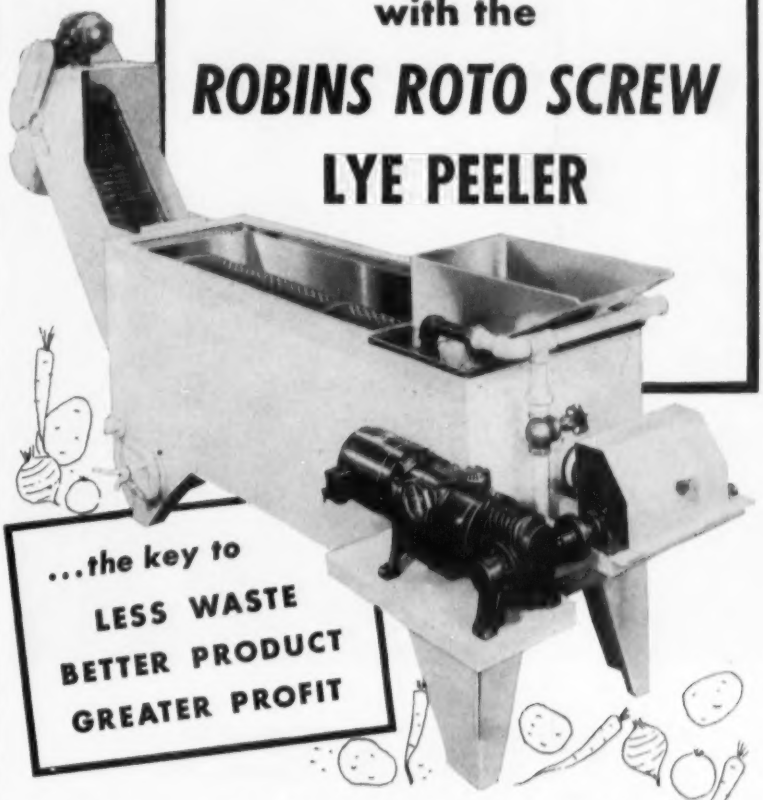
you get
CONTROLLED UNIFORMITY
with the
ROBINS ROTO SCREW
LYE PEELER



The "roto-screw action" eliminates floaters and carries stock through solution at a constant, controlled speed. Every piece of stock is treated to uniform depth, reducing peeling losses and time required for trimming.

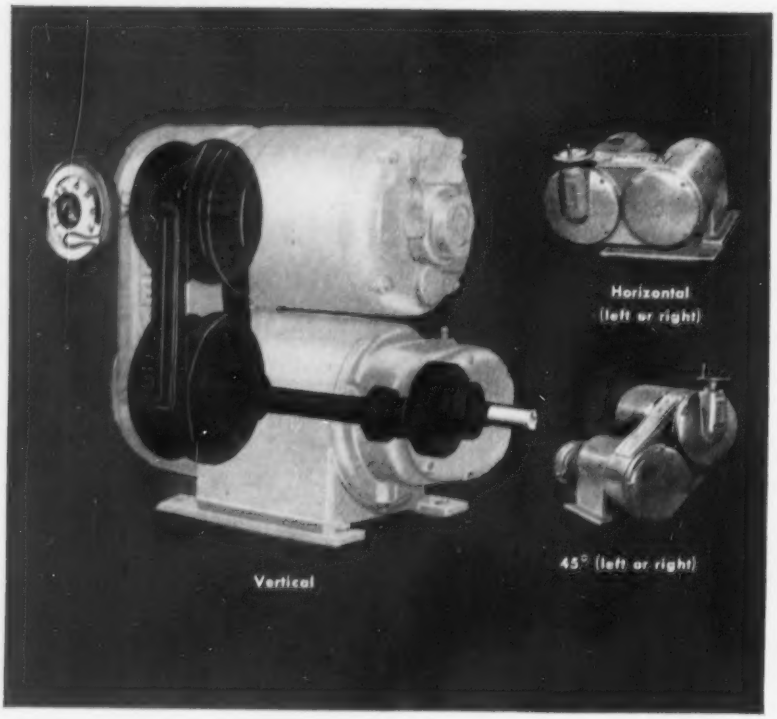
It's just that simple and foolproof. Set the time and temperature controls... load the hopper. After treatment, stock is picked up by Draper elevator and delivered to final washer. Excess lye drains back into tank. Models available for handling from 1000 to 8000 lbs. per hour.

Robins Roto-Screw Lye Peelers are paying off in extra profits in many plants throughout the country. If you want evidence of their performance—or want to see one in actual operation—get in touch with the Robins sales engineer in your territory or write or wire Baltimore.

A.K.Robins AND COMPANY, INC.
Manufacturers of Food Processing Machinery
Since 1855
713-729 E. Lombard St.
Baltimore 2, Md.

Take advantage of Robins experience when you want expert advice on plant layout, "standard" equipment or special equipment. We've solved many problems for food processors. Write for catalog.

A Compact Model to Fit Wherever You Need Variable Speed

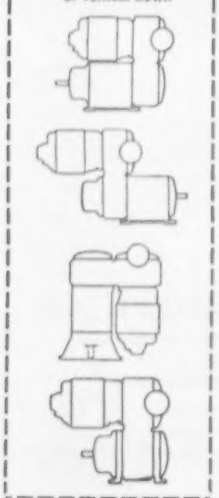


REEVES

FRACTIONAL *Vari-Speed* MOTODRIVE

WHERE DO YOU NEED THE OUTPUT SHAFT?

Motor side, control side, or vertical down



▶ REEVES fractional hp. Motodrive is a complete power package, engineered in over 100 assemblies, providing the advantages of variable speed to your machines—in minimum space.

Choose from vertical, 45° or horizontal models in ¼ to 1 hp. . . . get stepless accurate speeds—within a 2:1 to 10:1 range—from as low as 3 rpm to a maximum of 4660 rpm.

Available in standard, weather resistant, totally enclosed or splash-proof enclosures; full range of manual or automatic controls.

REEVES Motodrive—The *right* speed for *every* need . . . in *any* place.

Write Dept. FE23a-M543 for ratings and dimensions.

REEVES PULLEY COMPANY
Division of **RELIANCE** ELECTRIC AND ENGINEERING CO.
Columbus, Indiana

make sure the accounting system is set up to segregate these various cost elements.

Fuel is almost always the largest single item and may thus merit special attention, depending upon local conditions. Metered gas presents no problem. Fuel oil can be accounted for if storage tanks are accurately calibrated, receipts carefully checked.

Latter may be accomplished by specially-designed fuel oil meters now on the market. But proper allowance must then be made for temperature because the warmer the oil, the more volume a given weight of fuel occupies. Scales for weighing tank trucks or cars before and after unloading are preferable.

Coal offers another problem—amount in the stockpile. For this reason, most accurate accounting would call for hopper scales to weigh amount of coal fed to stokers or pulverizers during the accounting period.

When satisfied that you have accurate records of the cost of making your steam, there is still the problem of properly allocating cost. Therefore, you should have steam flow meters of the integrating type to totalize steam produced. This will enable you to calculate steam costs per thousand pounds—a common basis of measurement. Final step will then be to determine steam usage per case of product, which will probably require sub-metering steam to main departments.

As for keeping steam costs to a minimum, this is a big subject which cannot be adequately treated here. We recommend, however, that you keep a running record of cost of steam from month to month, and extend this to cover comparison with the same month of the previous year to even out seasonal factors. This will help you to track down variations as soon as they appear.

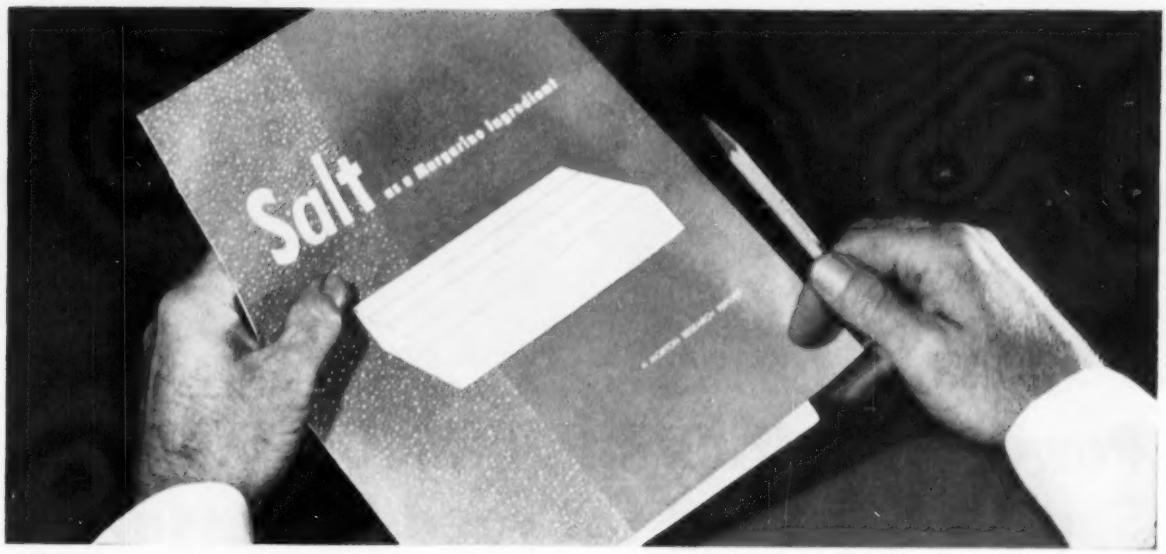
We further recommend periodic laboratory analyses of your fuel supplies so that you can be sure of getting the Btu's you are paying for. Finally, we suggest you supply your fireman with some sort of gas analyzer so that he can keep his furnaces operating at maximum efficiency.

Q.—Do you have a formula for making a batter mix for breading pork chops, veal cutlets, fish sticks, and shrimp?

A.—Blend together in a vertical beater-type or horizontal ribbon-type mixer: Cracker meal, 98½ lb.; whole egg solids, ½ lb.; salt, ½ lb.; and black pepper, ½ lb. Sea Kem 402, a cold-water-soluble extract of Irish moss, may be substituted for egg solids.

Morton Salt Company's new million dollar laboratory at Woodstock, Illinois, is at the service of the Food Industry to help solve problems relating to the use of salt. One type of service Morton offers is research reports like this . . .

New booklet about salt for making margarine



This fact-packed 6-page booklet, filled with interesting pictures and tables, gives up-to-date information on salt as a margarine ingredient. It shows the chemical and physical composition of available margarine salt as compared to the margarine product. It points out the effect of impurities in salt on the flavor and keeping qualities of margarine. And it explains quality control methods that may be used to evaluate margarine salt quality.

This booklet also shows how Morton '999' Salt more than meets the specifications for a margarine salt. '999' is a high purity, low cost salt which contains 99.9% clean, pure sodium chloride, exceptionally low in the objectionable trace metals, copper and iron. '999' is an evaporated granulated salt that won't break up in shipment and will dissolve uniformly. Morton '999' Salt has a practically constant weight per volume and is easily and efficiently dispensed by hand or machine.

Free Service Helps Morton Offers You

If you use salt for canning, packing or processing any food product, chances are Morton can help you make a better product for less money. In addition to free booklets and reports on salt for the Food Industry, Morton offers the services of one of their Food Technologists to assist you with on-the-spot help with any problem pertaining to salt. And he's backed by the services of chemists and salt scientists at Morton's ultra-modern research laboratory.

Remember, too, Morton makes many grades of salt for the Food Industry, and only Morton has 9 strategically located plants to serve you. We offer fast delivery from a bag to a trainload at favorable prices and freight, *anywhere* in the country.

Mail coupon today!

- ☐ Please send me your free booklet: "Salt as a Margarine Ingredient."
- ☐ I am not a margarine manufacturer, but would like more information on how Morton can help me _____

Name _____

Title _____

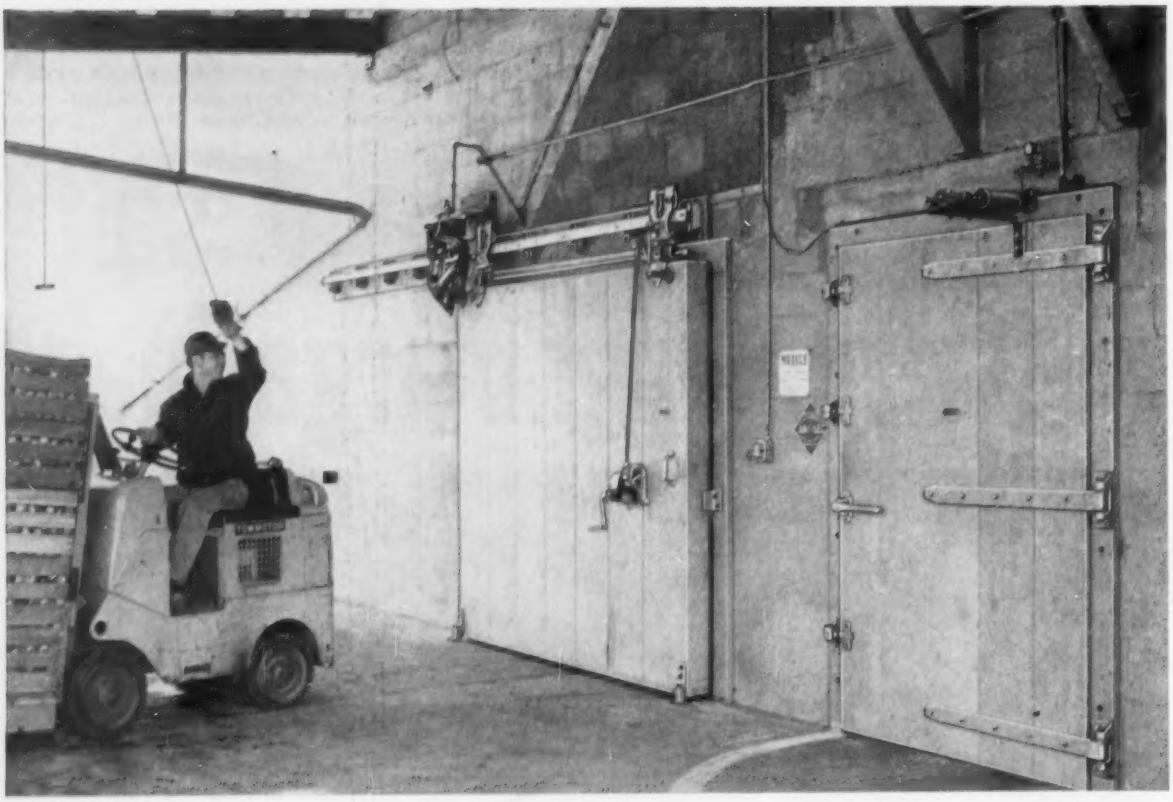
Company _____

Street _____

City _____ Zone _____ State _____

MORTON SALT COMPANY
INDUSTRIAL DIVISION
Dept. FE-9, 120 So. La Salle Street, Chicago 3, Illinois

For more data, circle this page number on card at front →



Jamison Horizontal Sliding Door saves space on the loading dock. Remote power operation saves operator time and effort.

Power Operation of JAMISON Doors Speeds Handling for Food Processor

Ample width of metal clad Series "50" door opening allows adequate clearance for truck and load.

C. H. Musselman Co., producers of food products at Biglersville, Pa., selected Jamison Doors for their apple cold storage. This gave them the efficient insulation and effective seal of Jamison door design. For rapid, automatic operation, both doors are equipped for remote power operation which saves time, and effort.

Count on Jamison Doors to solve your particular problem. Consult your architect or write direct to Jamison Cold Storage Door Company, Hagerstown, Md., U.S.A.

JAMISON

HAGERSTOWN, MARYLAND, U. S. A.

More JAMISON Doors are used by *more* people than any other Cold Storage Door in the world.

Faster Hardening

—Continued from page 80

—17F. (a big feature in the production of quality ice cream).

Filling of pints (80/min.) and quarts (42/min.) in paper containers is carried out with a rotary, 3-spout Pure-Pak filler. And half-gallons are handled on a straight-through, single-spout Anderson filling machine (32/min.).

The packages of cream are conveyed on a stainless steel, wire-woven belt (4 in. by 3½ ft.) to a point where they contact a metal plate (⅛x3x6 in.) set at right angles to the conveyor.

Then through action of a pair of limit switches, a pneumatically operated unit (20 psi.) alternately diverts pints (two at a time) or quarts and half-gallons (one at a time) to two similar belts on their way to the cooling tunnel.

Packages "close up ranks" as they transfer onto the crescent-shaped slats of these slower moving stainless conveyors. The conveyors subsequently make a right-angle turn to feed packages to the upper and lower conveyors (10x43 ft.) forming the two tiers of the cooling tunnel.

Built of carbon steel, the tunnel conveyors are vari-speed driven to move products a tunnel distance of 43 ft. in from 1½ to 3 hr., depending upon size of packages.

Feeding of the rows of packaged ice cream onto the two-tier cooling conveyors is fully automatic. Timing it through gears hooked to limit switches actuating hydraulically operated rams that push accumulated rows of packages onto the conveyors.

These carriers are installed in a 15½x 50 ft. cork-insulated (9-in.), low-temperature tunnel. Air (—40 to —50F.) is circulated through the tunnel at a 24,000-cfm. rate by a pair of 36-in. fans.

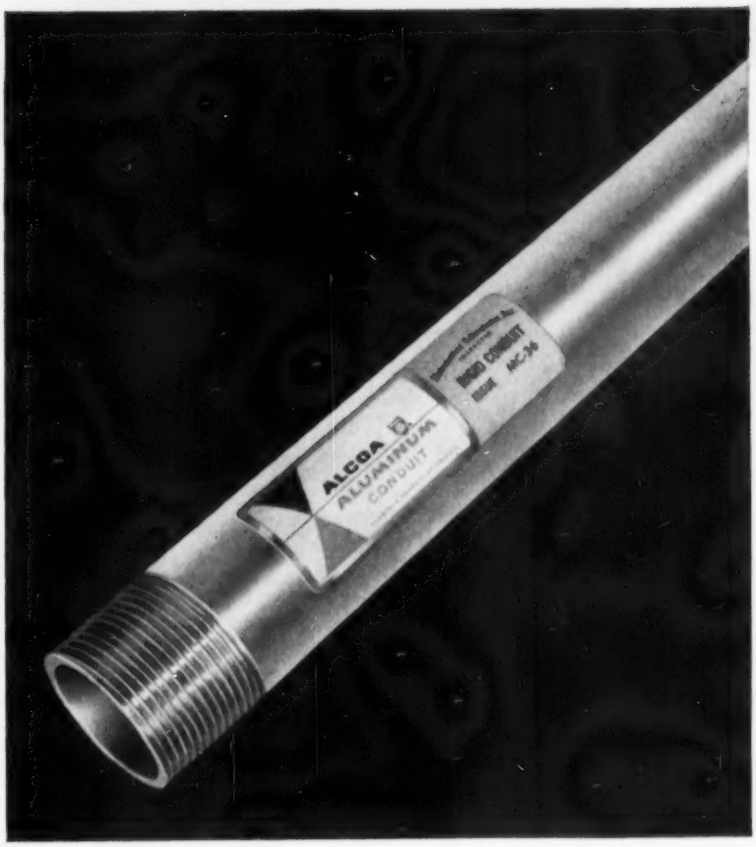
Hardened ice cream transfers onto two right-angle rubberized conveyor belts (1x14 ft.), and then onto another right-angle belt feeding a stainless steel bagging table. Bagged are pints (16 to a bag), quarts (8), and half-gallons (4).

Then, by a series of roller, skate, and combination belt-roller conveyors, the hardened, bagged cream goes to the 40x90-ft. low-temperature holding room.

Here they are loaded onto pallets and stacked two pallet-loads high. This room is equipped with two blowers that circulate —20 to —25F. air.

In case of calls for immediate delivery the ice cream is conveyed directly from bagging table onto trucks.

End (Resume reading on page 83)



BETTER LOOKING . . .

ELECTRICAL RIGID CONDUIT, made by Alcoa, is the kind to use where good appearance of the installation is important . . . as in beverage plants, food processing plants, laboratories.

And the good looks of conduit made from Alcoa® Aluminum are *permanent*.

It fights rust and corrosion. There's no coating to stain, peel or blister. It rarely needs painting.

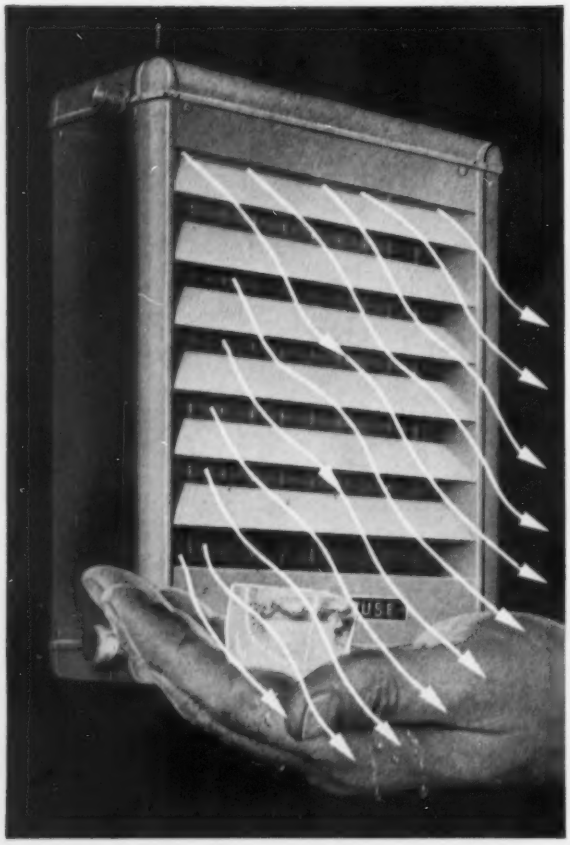
It's light, strong, easy to handle and install.

It has Underwriters' Laboratories approval . . . it's nonsparking and nonmagnetic. You can use it for hazardous locations . . . for separating conductors, regardless of load. It permits longer runs, or can save on wiring costs (because there is less voltage drop, smaller wires can be used).

Check on the advantages of rigid electrical conduit made by Alcoa. Contact any Alcoa sales office, or write Aluminum Company of America, 2328-J Alcoa Building, Pittsburgh 19, Pennsylvania.

Your Guide to the Best in Aluminum Value

THE ALCOA HOUR
TELEVISION'S FINEST LIVE DRAMA
ALTERNATE SUNDAY EVENINGS



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COVER PRESIDENTIAL CAMPAIGNS ON CBS TELEVISION AND RADIO

Oil Chemists Meet

—*Continued from page 89*

dustrial uses. Moreover, after bleaching and deodorizing, it becomes an excellent edible oil. Deodorization reduces its fatty-acid content to the same level as that obtained in alkali-refined soybean oil.

Phosphorus content, which indicates the amount of gum, is cut from 750 to 2 micrograms per gram of oil with use of 0.1% acetic anhydride, the optimum concentration. Lecithin obtained on drying the gums is equal to that from conventional degumming.

Higher Meal Extraction

Mechanical screw presses can now be operated to leave consistently less than 3% of oil in cottonseed meal.

It's accomplished by the use of extension cages that increase drainage time by 40%, reported A. Burner, French Oil Mill Machinery Co., Piqua, Ohio. In fact, some mills have averaged 2.5% residual oil, or less.

Since the development of screw presses, the trend has been to boost throughput in an attempt to cut capital investment. But, the speaker cautioned, this contradicts a basic principle discovered in hydraulic-press operation—namely, that drainage time is essential to efficient extraction.

Conductivity Test for Soap

Rapid gaging of soap in refined vegetable oil is now possible with a new conductivity method described by H. Goff, Jr. and F. E. Blachly, Sharples Corp., Philadelphia.

Briefly, it involves extracting the soap with hot water and analyzing the extract for sodium by measuring its conductance. Former lack of a standard reproducible procedure makes this test particularly useful.

Antioxidant for Package

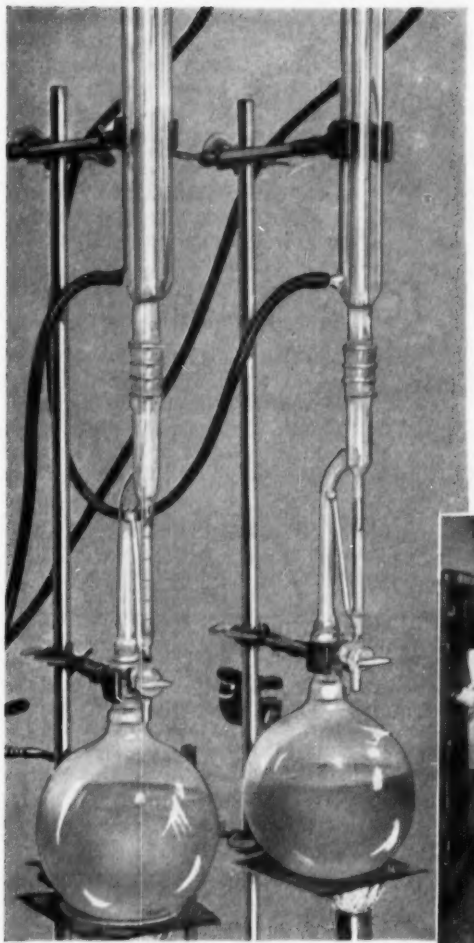
Shelf-life of foods packaged in paperboard can be markedly improved by incorporating an antioxidant into the container, asserted M. E. Doyle and R. D. Sullivan, Shell Development Co., Emeryville, Calif.

Effective protection is afforded by an antioxidant such as 2,6 ditertiary butyl-4-methyl phenol (Ionol), which has been approved for use in edible fats and oils. It inhibits rancidity in the fat that migrates from the product into the wrapping.

End (*Resume reading on page 90*)

It must be ~~good~~ Better (for you) to bear the name

Griffith



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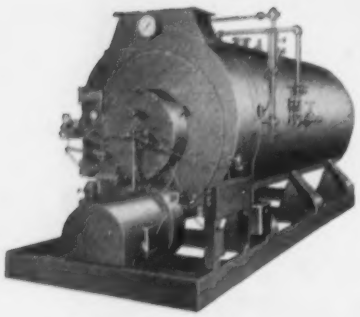

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And remember—one-third smaller than ordinary generators of similar capacity, a Cyclotherm fits almost anywhere. Many plants have installed two Cyclotherms for utmost flexibility and power. Burns gas or oil with quick changeover. 18 to 500 hp, 15 to 200 psi.

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Useful New Books & Government Publications

Why Consumer Diets

DICTIONARY OF DIETETICS *By Rhoda Ellis. Published by Philosophical Library, 15 E. 40th St., New York City 16. 1956. 5¾ x 8¾ in., cloth. Price:* $6.

Book is a compilation of terms and references dealing with diet and diet therapy. Though not a "must" for food processors, it does provide a good deal of interesting information. For example, the book discusses diet in relation to background, food habits, and economic status, as well as psychological factors.

With the current surge of interest in dietetics, the processor might find in this book a key to some of the consumer trends, particularly those that are regional.

Two Personnel Reports

Following are two reports published by the Research Division, California Personnel Management Assoc., Farm Credit Bldg., 2180 Milvia St., Berkeley 4, Calif. Price: $1. each.

SUPPLEMENTARY UNEMPLOYMENT PAY PLANS (*Report* # 236). Stenographic brief of a panel report given before the association. Panel members include representatives from American Can Co., and C & H Sugar Refining Corp.

GUARANTEED ANNUAL WAGE AND EMPLOYMENT STABILIZATION (*Report No.* 248). Collection of current reference and research sources prepared for the association.

The Mechanical Brains

COMPUTERS: THEIR OPERATION AND APPLICATION *by Edmunt Berkeley and Lawrence Wainwright. Published by Reinhold Publishing Corp., 430 Park Ave., New York City 22. 1956. 366 pages. 6x9 in., cloth. Price:* $8.

Of special interest to management, engineers, and technicians, this book provides a simple and practical guide

FE REPRINTS AVAILABLE

Listed below are special sections, flowsheet book, and articles from past issues of FOOD ENGINEERING which are available in reprint form. Single-copy prices are listed. For orders of 20 or more, there is a 25% discount. To order reprints, use coupon at bottom of page. You will be billed when your order is filled.

8. Newer Ingredients $1.25

Twenty-page report on the newer ingredients which aid in producing better food products (May, 1952). It includes detailed articles on these subjects: (1) Guide to Optional "Chemical" Additives. (2) Antioxidants Provide New Flavor Controls. (3) Industrial Enzymes Now Speed Natural Processes. (4) Food Emulsifiers Bring New Highs in Uniformity. (5) Seaweed Extractives Find Versatile Uses in Foods.

9. Vacuum Cooling.....$0.75

Eight-page special report covering the use of efficient vacuum cooling in a wide variety of food processing operations to save costly process time, reduce labor, increase output, and avoid spoilage losses (October, 1952). Preference data for specific types of applications are presented in this engineering study.

10. Packaging Materials $1.00

Sixteen-page report on how to get better production-line performance with packaging materials and containers (March, 1952). It includes these comprehensive articles: (1) Developing Your Package for High Output. (2) How Properties of Materials Affect Packaging Speeds. (3) Nipping Production Slowdowns by Prechecking Supplies. (4) Tips on Ordering Materials for Top Performance. (5) Proper Storage of Your Stock Averts Line Headaches.

11. Sanitation $0.50

Six-page report on "How to Assure Top Sanitation in Your Processing Equipment" (Jan. 1952). This report was a reprint of one section of a practical book on food plant sanitation prepared by Association of Food Industry Sanitarians.

12. Materials Handling.....$1.00

Twelve-page report entitled "How Modern Materials Handling Gives New Spurt in Processing" (March, 1951). Case histories of important savings through more efficient handling are presented. And the different types of handling equipment are described and illustrated.

13. Mixing $0.50

Four-page roundup of progress in plant mixing methods and equipment, plus a forecast of what is ahead (Oct. 1953). Performance data are included as yardsticks of what can be achieved.

14. Aseptic Canning $0.75

Eight pages, including foldout picture flowsheet, describe, evaluate, and illustrate in detail the continuous, short-time, high-temperature aseptic canning process that won the 1951 Food Engineering Award. (June, 1951).

Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.
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to automatic computers and their potential applications. All types—digital, analog, miniature—are discussed in detail.

The book explains what the machines are and how they work. It covers their reliability, limitations, and maintenance.

Included is a checklist of computer characteristics, a bibliography of computer literature, a listing of sales c renting agencies, and a glossary of terms and expressions peculiar to the computer and allied fields.

Electricity Simplified

INDUSTRIAL ELECTRICITY Vol. I by *Chester L. Dawes. Published by McGraw-Hill Book Co., 330 W. 42nd St., New York City 36. 1956. 431 pages. 6¼x9¼ in., cloth. Price:* $5.50.

A new edition of a standard reference, book has been revised to make it more suitable for use at the technical institute level. Purpose in mind was to help supply industry with technically trained men versed in the theory and practice of electricity.

The work approaches principles of the science from fundamental levels in language that is simple and direct. Among other topics, it covers circuits, electrostatics, and primary and secondary batteries.

Guide to U.S. Labs

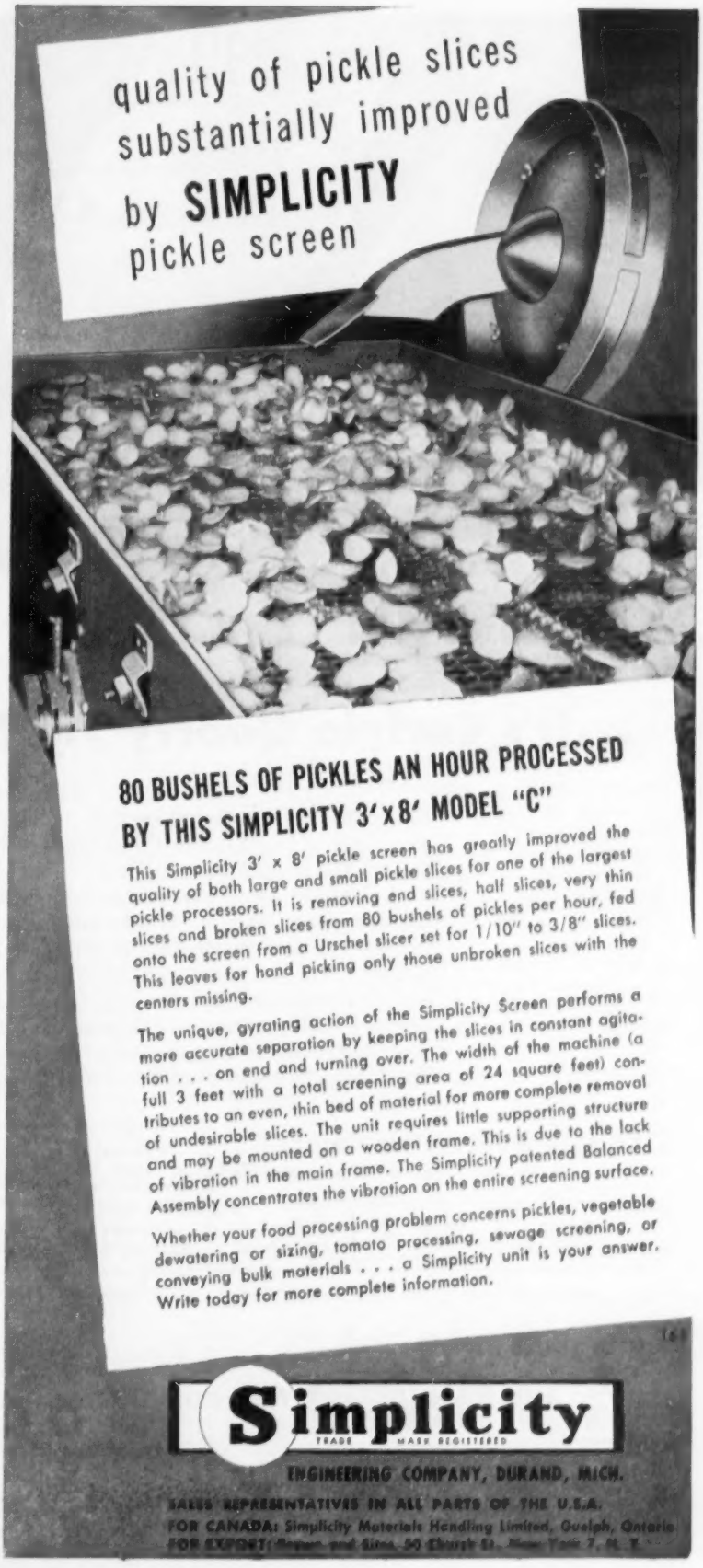
INDUSTRIAL RESEARCH LABORATORIES OF THE UNITED STATES (1956). *Published by National Academy of Sciences—National Research Council, 2101 Constitution Ave., Washington 25, D.C. 1956. 560 pages. 7x10¼ in., cloth. Price:* $10.

Over 4,800 laboratories are listed in this up-to-date directory. The entry for each is complete with location, executive listings, employee statistics. A simple letter code identifies the type of research carried on at the lab, as well as its availability for outside testing or research.

An index of over 1,000 research activities provides the user with a quick key in his search. Laboratories themselves are indexed alphabetically.

Booklets & Reports

PROBLEMS IN MEASUREMENT OF EXPENDITURES ON SELECTED ITEMS OF SUPPLEMENTARY EMPLOYEE REMUNERATION. (*Bulletin No.* 1186) *Published by U. S. Dept. of Labor, 341 9th Ave., New York City. Price:* $.50. Survey of employers' recordkeeping practices.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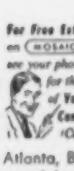

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KEEPING UP WITH THE FIELD

Technical News • Washington Highlights • Economic Trends • Labor Developments

New Can Handling System

Plywood bulk bins—each holding 9,000 cans and equipped for fork truck handling—now dispense containers at F. & M. Schaefer Brewing Co., Brooklyn, N. Y. The pattern-packed holders (American Can Co.) have hinged gates that permit cans to fall onto a conveyor leading to an unscrambler.

FDA Prestige Takes Sharp Upturn Through Actions of '56 Congress

After several lean years of budget slashes and personnel cuts, FDA has now bounced back with the help of a sympathetic 84th Congress.

In fact, seasoned Washington observers, in and out of Congress, say that never in recent years has FDA been held in such high esteem by the law makers as it is at present. And they see in this year's actions a favorable outlook for future FDA objectives, which include the 3- to 4-fold expansion recommended in '55 by a Citizens' Advisory Committee.

To lend emphasis to this picture, here's a rundown on food and drug legislation passed this past term—and Washington's forecast for the bills still pending that had their groundwork thrashed out this year.

• Congress approved a $995,000 budget hike for the agency (FE May, p. 197). This increase will permit FDA to boost personnel to a point slightly over its previous peak level in fiscal '52, and thus increase number of plant and imported-product inspections by over 20%.

• Also, the legislators okayed a new, $12,200,000 office and lab building for FDA's Washington personnel. Agency hopes to have the building ready for occupancy in 1960.

• Looking ahead, an amendment to the Food & Drug Law to require inspection of interstate poultry plants—a plan strongly backed by FDA—looks like a good bet for approval next year. Chances are inspection will actually be handled by the experienced graders now employed in USDA's voluntary program (FE July, p. 189). But rules and regulations will be modeled on those long applied by FDA to the meat branch.

• Almost certain to be voted next year is an industry-sponsored bill—which FDA supports—permitting U. S. buyers to re-export contaminated foods. Under the present rules, such shipments must be destroyed after seizure by FDA.

The proposed change would permit the buyer to send goods back to the country of origin if he can convince a Federal judge that he was an innocent party to the violation.

• Only major disappointment of the year for FDA was its failure to get action on the chemical additives bill. No one seriously disputes the need for such a law. But chemical manufacturers want firm guarantees that adverse FDA rulings can be appealed to the courts.

The Agency stands pat on refusing to have the safety—and use—of a proposed ingredient left up to a jury.

FDA intends to press its case again next year on this matter. But there are no signs yet of a compromise to ease the conflict.

Food Exports Up in '55

Foreign dollar sales of U. S. farm products rose 10% in the '55 fiscal year, ending June 30, say USDA officials. But, if cotton is excluded, the figure jumps to 24%.

Here's the breakdown: Grains, $1,170,000,000, up 33%; vegetable oils and oil seed, $400,000,000, up 32%; fruits and vegetables, $325,000,000, up 19%; live stock products, $545,000,000, up 18%; products donated for welfare use, $175,000,000, up 23%; and other products, $105,000,000, up 11%.

Studies Quality of Frozens

Comprehensive studies on fruits, vegetables, and poultry to show how fast their quality drops at storage temperatures of 0, 10, 20, and 30F. have been announced by USDA's WURB, Albany, Calif.

Five fruits, four vegetables, and several types of poultry products were picked for the investigations, which started back in 1950. The information will be published soon in a series of technical reports.

Atoms, Drugs & Plastics To Alter Food Picture

A crystal-ball glimpse of the future was given candy men attending the recent National Confectioners' Assn. convention in Boston.

Speaking of what's ahead in food technology, Herbert M. Cleaves, Vice-President, General Foods Corp., declared that within a few years the food business will change so radically that everything we do today will be old-fashioned.

Main areas of product advance, said he, will be in taste, economy, convenience, and nutrition. But this will lead to improvements in production and distribution. Food men will turn to such new aids as atomic radiation, antibiotics, radio-isotopes, and revolutionary plastic films to help solve their processing and packaging problems.

Boom in Prepackaging

At least 50% of all fresh produce will be prepackaged by 1960, reports the Folding Paper Box Assn.

This reveals the confidence felt by industry men in a boom that has lifted prepackaging of fresh fruits and vegetables from a slight 5% of the nation's total produce in 1950 to about 20% in '55.

Unusual New Ion-Exclusion Technique Promises 7-10% Boost in Sugar Yields

Dramatic increases of 7½ to 10% in cane and beet sugar yields are now said to be possible through use of a unique ion-exclusion process, developed jointly by Ultra Sucro Co., New York City, Illinois Water Treatment Co., Rockford, Ill., and Dow Chemical Co., Midland, Mich.

A demonstration plant has been erected at Rockford to show sugar makers the benefits of the method under actual operating conditions.

The new technique, which operates on an auxiliary installation and thus does not supplant existing equipment, aims at improving the present end-point in sugar refining. Here, a heavy build-up of minerals and other impurities prevents further crystallization of sugar from the blackstrap, and leads to sizable sucrose losses.

But now, a processor can pass his syrup over a low-cost resin bed—just prior to the final boiling—and extract over 90% of the impeding impurities, announces the company.

Because of a high, ionic concentration within the special resin, mineral ions in the syrup are rejected and flow rapidly through the bed. The non-ionic sucrose, however, permeates the resin and is held. No costly regenerators are needed. For, sugar is readily removed from the resin with plain water, and is then passed on to conventional boiling and crystallizing stages where sugar is extracted.

Tighter Reins on Packers Urged in Senate Probe

Preliminary investigation of alleged monopoly and unfair trade practices in meat marketing by a Senate anti-trust committee has already stirred up charges against four, major meat packers, and demands for tighter regulation of this industry branch.

Small, independent packers claim that the four top companies—Swift & Co., Armour & Co., Wilson & Co., and Cudahy Packing Co. — control about 50% of the business, sell meat at a loss in certain areas to drive out competition, and make exclusive discount arrangements with big chain stores. Also, they say some chain stores have entered the meat packing business to depress prices and destroy competition, and that USDA has failed to enforce provisions of the Packers and Stockyards Act against restrictive trade practices.

Senator J. C. O'Mahoney (D.-Wyo.), the committee chairman, is reported sympathetic to the independents' request that USDA's authority be transferred by law to either the Federal Trade Commission or the Justice Department.

Big meat packers, chain stores, and the USDA have not been heard from yet—but can all be expected to contradict small packer testimony and oppose the proposed legislative changes.

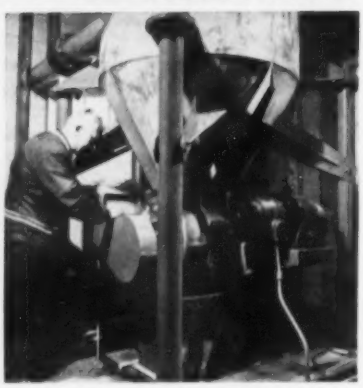
Hearings are expected to resume before the end of the year.

Special Frames for Semi's

No jacks are used to support semi-trailers in Illinois Central Railroad's piggy-back service. Instead, a welded frame lifts out of the flat car floor to do the job. At destination, truck tractor merely backs up, knocks down the frame, and automatically attaches itself to the trailer.

Moves Berries By Air

In a unique application of pneumatic conveying, the National Cranberry Assn., Onset, Mass., "pumps" frozen cranberries from its freezer warehouse (top) through a 400-ft. pipe to . . .



. . . a receiver at the processing center (right). Here, berries are separated from air blast and forced into a holding bin by a rotary feeder. The system (Dracco Corp., Cleveland) is said to need only two men, thus cutting former manual handling costs a full 90%.

Army Installs Freezers

New potential for frozen food packers is seen in recent action by Department of the Army, whereby bases in continental U. S. will install frozen food cabinets.

The move, brought on by increased use of frozens in army messes, is expected to boost use of these frosted products even further.

Meat Output Up Over '55

At the end of six months, 1956 production of red meats totalled 13,239,000,000 lb.—up 9% over '55 figures for the same period (12,116,000,000 lb.), reports USDA.

Beef and pork were the big gainers in this picture, jumping 10 and 11%, respectively. Veal increased only slightly. And mutton and lamb output were actually down 3%.

FE Editor Calling . . .

"Unusual opportunity awaits one of our readers. Food Engineering is looking for an alert young man now engaged in food packaging operations—a man who likes to write and has a good personality.

"He will be the packaging specialist on the New York editorial staff, where he can be widely known as a packaging authority and advance in his chosen profession.

"When reader turns editor, he moves into a unique position. He is in touch with progress throughout his field. He makes important contributions to the advancement of his industry. And he builds his professional stature.

"It takes a good man to fill the bill. If you have the qualifications and are interested—or know someone who does and is—I am the man to contact"—Frank K. Lawler, Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.

Hors d'Oeuvres

▶ **Hitting a high price in mid-August, beef on the hoof almost kicked a plank out of a political platform before it was even nailed down.**

▶ Everyone at the Democratic convention already knew the pleasure of thirst quenching with carbonated beverages. So why the free samples?—Oh! TV cameras.

▶ **There now are 48.8 million households in this country. Save the good woman, in each of them, 4 hr. a day with quick-serve foods, and you free 195.2 million woman-hours. That's enough to produce 2 billion yards of backyard gossip.**

▶ Research by du Pont reveals that 80.1% of candy sold in supermarkets is bought on impulse. Temptation has its points.

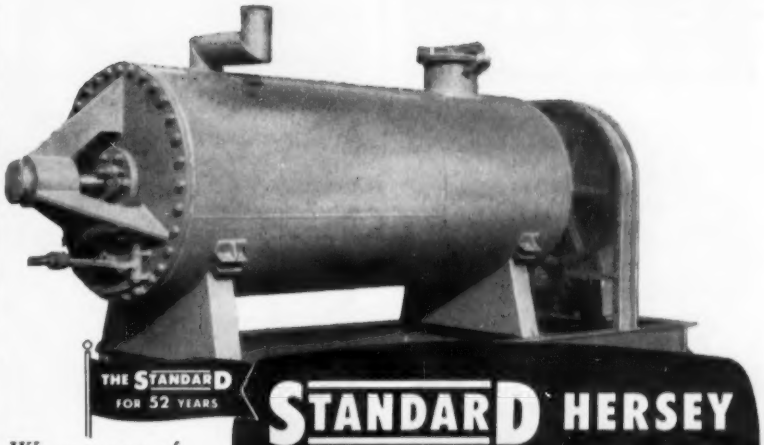
▶ **Candy pops with a built-in whistle have been introduced by Dagmar Candy Co. There was a time when you could quiet a kid with candy.**

▶ If a Pittsburgh-size city used electricity from atom-fueled power plants, a million gallons of radioactive waste would be produced annually. And it would stay "hot" for 600 years. If you decide to irradiate foods, you won't run short of gamma rays.

▶ **Output of Scotch whiskey is expected to meet future demands. Thought you might like to know.**

▶ Dry skim milk—in recent years called "nonfat dry milk solids"—now officially becomes "nonfat dry milk." That's progress. But why not some competitive "sell" with the name "nonfat waterless milk?"

▶ **Heinz, the house of 57 varieties, now produces 480 different items. Pretty soon it can add a zero to that famous trademark.**



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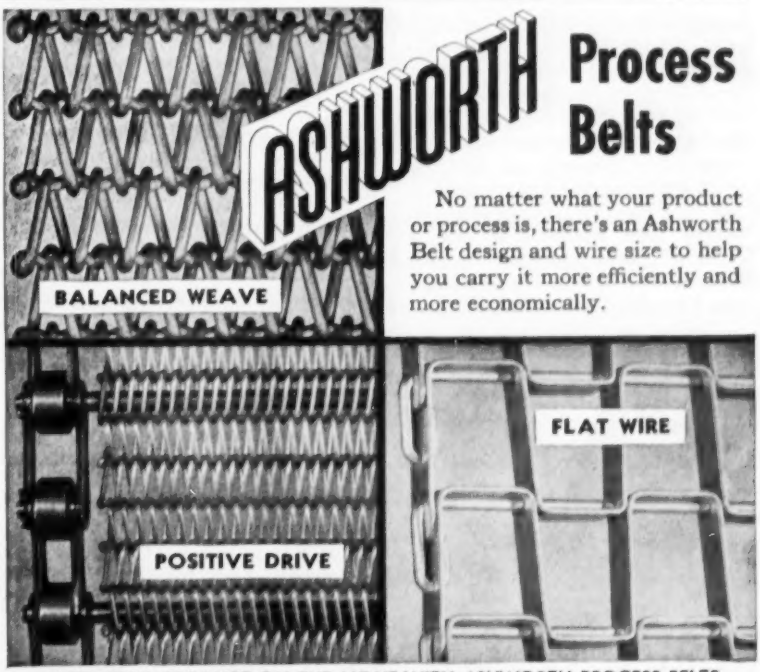

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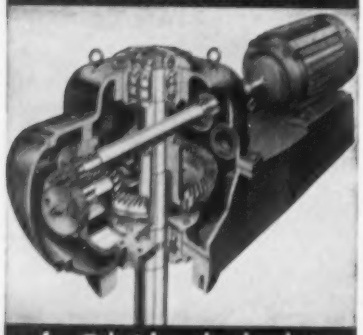

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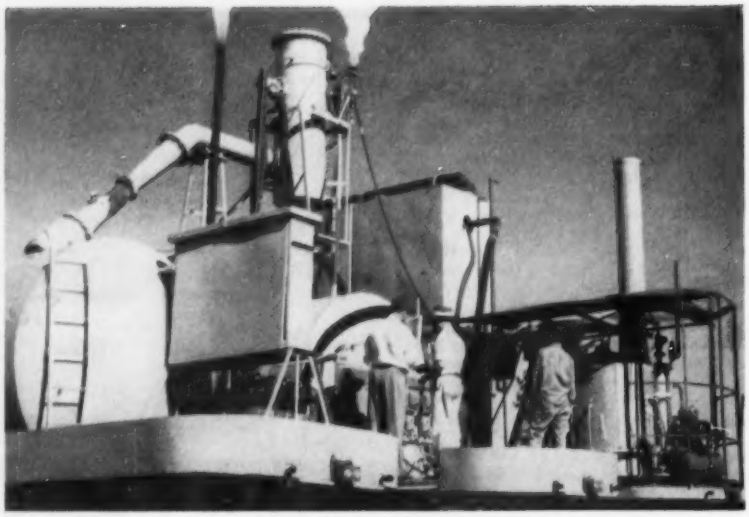


Trailer-Mounted Cooler Chills Produce

Lettuce is given increased market life by a new, portable vacuum cooling plant (Hi-Vac Coolers Inc.) shown here in operation at Oswego, N. Y. Produce is loaded into two pressure-tight cylinders (left and center). Then, steam jets draw a 29.8-in. vacuum that vaporizes a small amount of water (2%) in the heads and quickly reduces temperature from 70 to 38F. Steam at 200 psi, is provided on demand by a compact, oil-fired boiler (Vapor Heating Corp.). Entire unit is mounted on three trailers, and can be packed up and moved in a day.

Revamps Fish & Wild Life

Commercial fishermen have gained new prestige in a recent bill that reorganizes Fish and Wildlife Service of the Department of Interior.

Under the new setup, an Assistant Interior Secretary will devote full time to the Service. Commercial interests will be concentrated in a special subdivision. Sport fishing and wildlife are to be split off in another branch.

The reshuffle gives commercial men a much stronger voice in fishing problems, such as the one on international off-shore territorial rights coming up for United Nations consideration this fall.

Meats Into Sweets?

A new market may be opening up for beef, with the discovery that the dried product can be mixed with coconut, toasted, then combined with marshmallow, chocolate fudge, or penuche to form a meat candy bar, says American Meat Institute, Chicago.

The produce doesn't require refrigeration either.

Starts Radiation Research

Purchase of a 3,000,000-volt Van de Graaff accelerator launches Mellon Institute into major research in the field of peaceful atomic energy applications, announces Gen. Matthew B. Ridgeway, chairman of the board of trustees.

The pioneer scientific organization has also selected Dr. Robert H. Schuler, former staff member at the U. S. Atomic Energy Commission's Brookhaven lab, to head up the new department.

Makes Feathers Into Feed

Poultry packers, buried under mountains of waste feathers, can take new hope from recent research on by-product utilization, says Food Research Laboratories, Inc., Long Island City, N. Y.

Feather meal can be a valuable source of proteins in animal feeds. For, investigations show that hydrolyzing the feathers in steam cookers produces digestible cystine and other amino acids—compounds that are now in short supply.

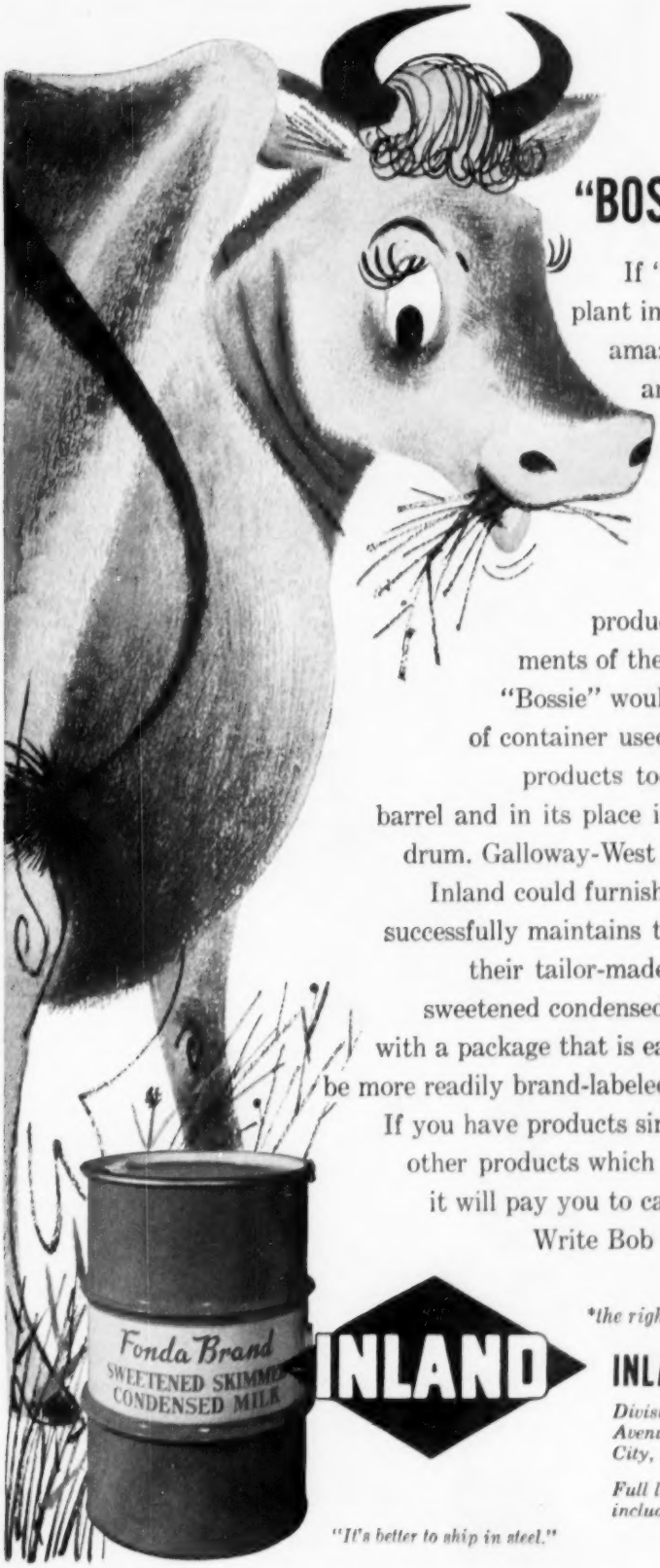
Exports Butter Product

A new product, made from surplus butter and non-fat dry milk, will be manufactured by Beatrice Food Co., Chicago, for export to Sweden, Switzerland, and Finland.

The dry mix, which has a high butter fat content, will be used as an ingredient in cake and doughnut mixes —products not being marketed now in those countries.

The experimental sale, says USDA, is aimed at expanding foreign markets for U. S. dairy items.

*"Another product safely shipped in Inland 'protection-eered' containers"**



"BOSSIE" WOULD BE AMAZED!

If "Bossie" could visit the Galloway-West plant in Fond du Lac, Wisconsin, she would be amazed to see what happens to her milk! It arrives at one of the most modern and sanitary milk processing plants in the country in the familiar farmer's milk can. A few hours later, it leaves in the form of a variety of liquid, semi-solid and powdered milk products, ready to meet the exacting requirements of the dairying, baking and candy industries. "Bossie" would be even more amazed to see the type of container used by Galloway-West to ship their milk products today. Gone is the old-fashioned wooden barrel and in its place is a modern, sanitary-lined, Inland steel drum. Galloway-West switched to steel when they found that Inland could furnish them with a lined drum that not only successfully maintains the critical quality control standards of their tailor-made milk products, such as their "Fonda" sweetened condensed skimmed milk, but also provides them with a package that is easier to handle, more attractive and can be more readily brand-labeled.

If you have products similar to those of Galloway-West, or any other products which require a "protection-eered" container, it will pay you to call on Inland Steel Container Company. Write Bob Boecher, Room 245-D, for information.

**the right container with the right lining for your products.*

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Division of Inland Steel Company • 6532 South Menard Avenue • Chicago 38, Illinois • Plants: Chicago, Jersey City, New Orleans, Cleveland and Greenville, Ohio

Full line of steel and stainless steel shipping containers, including galvanized and heavy duty ICC drums.

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A for apple is the beginning of most primers. And apple is the first choice in flavor with most Americans, who enjoy an alphabet of apple dishes. To the distinguished family of Firmenich flavors, now enhancing many food products, is added that of Apple, captured by patient research and recreated by chemical skill. It is another Firmenich achievement, already welcomed by manufacturers who have added this popular flavor to their line of products; by others to improve those already established. Highly concentrated, stable, of the utmost fidelity and purity, Imitation Apple by Firmenich is offered with pride for your profitable use. Samples and technical data on request.

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Rolling Custard Plant

To spark the stay-at-home trade, this panel truck now brings frozen custard production right into the neighborhood in Irvington, N. J. The custom-made mobile unit houses not only a freezer, but a refrigerator for supplies and a sink with hot and cold running water. A sliding panel closes service counter when truck is on the road.

New High in Canned Citrus

Florida canners took a bigger slice of the state's citrus crop in 1955-56 than ever before, reports the Florida Canners Assn.

About 85,000,000 boxes of oranges, grapefruit, and tangerines went into cans this past season—63% of the estimated crop of 134,600,000 boxes, says C. C. Rathbun, Association executive secretary.

Major item was, of course, frozen orange concentrate with a record production of 70,000,000 gal. Frozen grapefruit concentrate also set a new high of 2,500,000 gal.

Sugar Prices May Rise

The mounting cost of refining sugar is exerting definite pressure on refined sugar prices, says B. W. Dyer & Co., New York City sugar economists. An upward trend in raw sugar price is having a like effect.

Average weekly earning of production workers in cane sugar refining is now 12% over the comparable period in early '55, the company points out. And even the higher margin between raw and refined sugar prices, and a potential increase in refining volume this year will only partly off-set the squeeze.

New Color for Citrus

A new vegetable dye—extracted from the citrus rind, itself—is put forth by Commonwealth Engineering Co., Dayton, Ohio, as a solution to

VIKING 171 "Sanitor" PUMP

the sanitary pump that fits so many applications

FOR truck delivery use dairy or food plant transfer or for mounting on other processing equipment

the 3-A approved basic Fig. 171 Viking "Sanitor" in 20, 35, 50 and 90 GPM sizes is your answer. Available in 39 models and all featuring easy take down—rapid cleaning—fast, self-priming—smooth and positive delivery—non-leak operation. For complete information, send today for Catalog Fe.

VIKING PUMP COMPANY

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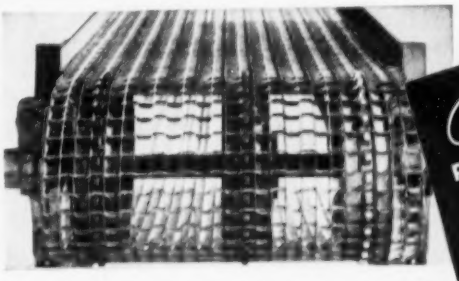
See our catalog in Sweets



Reduces PROCESSING COSTS

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FLEXIBLE STEEL CONVEYOR BELTING

Because this long wearing, sanitary conveyor belting resists heat, cold, moisture, oils, detergents, acids, grease, corrosion and is easily sterilized with steam or scalding water, it has gained the widespread acceptance of leading food manufacturers everywhere. It is ideally adaptable to grading, sorting, packing and peeling tables as well as scalders, washers, cookers, exhausters and other processing equipment. It will not stretch will not deteriorate while not in use and will not creep, weave nor jump. Its perfectly flat surface also provides for conveying all types of containers, empty or filled. Available in 1" x 1", ½" x 1", and ½" x ½" mesh in any length and practically any width.

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IN PACKAGING Cottage Cheese, Sour Cream, Potato Salad, Honey, Cream Cheese, Gelatine Salads

You'll speed up production, save a fortune on labor costs, and have better, more sanitary packages, with fully automatic Anderson equipment. Use Model 34-F for any size or make of nesting round cup up to and including pints . . . Model 34F-20 for sizes up to 32 ounces.

MODEL 34 F

DISPENSES—FILLS AND CAPS 18-58 PER MINUTE

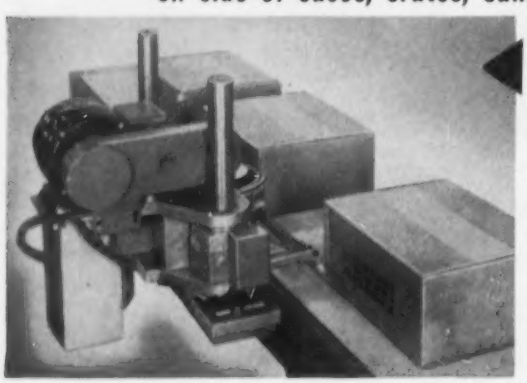
Anderson equipment is preferred for simple operation and dependable performance — proved by actual daily use in dairy and food plants.

Write for Bulletin 9-10

ANDERSON BROS. MFG. CO.
ROCKFORD, ILLINOIS

New Package-Imprinting Attachment

makes accurately-located, high-quality imprints on side of cases, crates, cans, etc.



Model "750" ROLAPRINTER machine . . . imprints contents identifications, other legends on side surface of set-up cartons and cases, rectangular metal cans, wood crates, wire or strap-bound bundles, etc. Attaches to conveyor, case-sealer, other production equipment. Not just another "marker" but a precision imprinter that gives "printing-press" results. Also available for imprinting all 4 sides.

This new unit is fully automatic, operates by means of microswitch-activated electro-mechanism that registers imprints accurately; has built-in motor-driven flexographic printing system that synchronizes with surface speed of package. Uses fast-drying liquid ink of any color and rubber type or dies.

Write for descriptive Bulletin RIN-5

Gottscho

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In Canada: RICHARDSON AGENCIES, LTD., Toronto & Montreal

Automatic Production-Line CODING, MARKING IMPRINTING MACHINES

problem of coloring Florida oranges.

This latest material, a carotene yellow pigment extracted from citrus oil by a carbon filtering process, is applied to the oranges in a spray. Fruit is prepared for the coloring step by a hot dip that precoats it with an edible fat.

Reveals Second Ghee Sale

USDA has announced the sale of 2,067,915 lb. of surplus butter to Iran in the form of ghee. This follows close on the heels of the first such sale to Pakistan (FE May, p. 197), which is now being processed for shipment by Consolidated Badger Cooperative, Shawano, Wis.

The latest purchase runs foreign sales of this product by USDA to a total of 4,567,915 lb.

Food, Packaging Courses

Two universities are offering five courses in food engineering and packaging in night school sessions this fall.

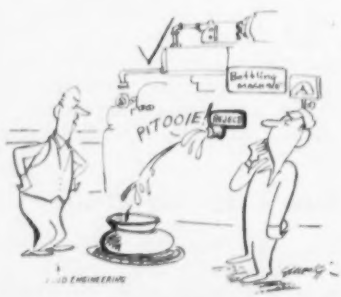
At Columbia U., New York City, 24 experts will present a 30-week series on consumer and shipping packaging, starting Oct. 3.

At Illinois Institute of Technology, Chicago, four courses will cover food packaging materials and methods, public health aspects of food engineering, unit operations, and food engineering in the laboratory.

Phi Tau Sigma Elects

New officers for the 1956-57 year have been elected by Phi Tau Sigma, national honor society for food scientists, at the second annual meeting held in St. Louis.

Selected to guide the society are: Dr. C. S. Pederson, Cornell U., president; Dr. E. N. Mark, U. of California, vice-president; Dr. E. E. Anderson, U. of Massachusetts, secretary-treasurer.



"I just don't like that rejector."

Competent, scheduled instrument maintenance service at Schroeder Products Co. Inc., major producer of coffee concentrates at Woburn, Mass. Gordon Andrews, shown here, typifies the factory-trained Foxboro Service Technicians serving the industry from nearby engineering offices.

Scheduled Service that saves you costly shutdowns!

There's no better way to avoid costly shutdowns, *during vital production seasons or year-round operations,* than by keeping your Foxboro Instruments and control systems running at peak efficiency. And the simplest, most economical way to do it is with a Foxboro Scheduled Service Agreement.

Under this plan, a Foxboro Service Technician will call at your plant at regular, specified intervals to maintain, clean, and service your Foxboro Instruments. You'll not only be served by competent, factory-trained personnel, using genuine Foxboro parts and methods; you'll also save substantially over non-contract service. Supervision of instrument installation is also available where needed.

Don't wait until you're in trouble when it's so easy to prevent it. Let us recommend a preventive maintenance schedule for your plant now. Ask your Foxboro Field Engineer, or write for information. **The Foxboro Company, 309 Neponset Avenue, Foxboro, Mass., U.S.A.**

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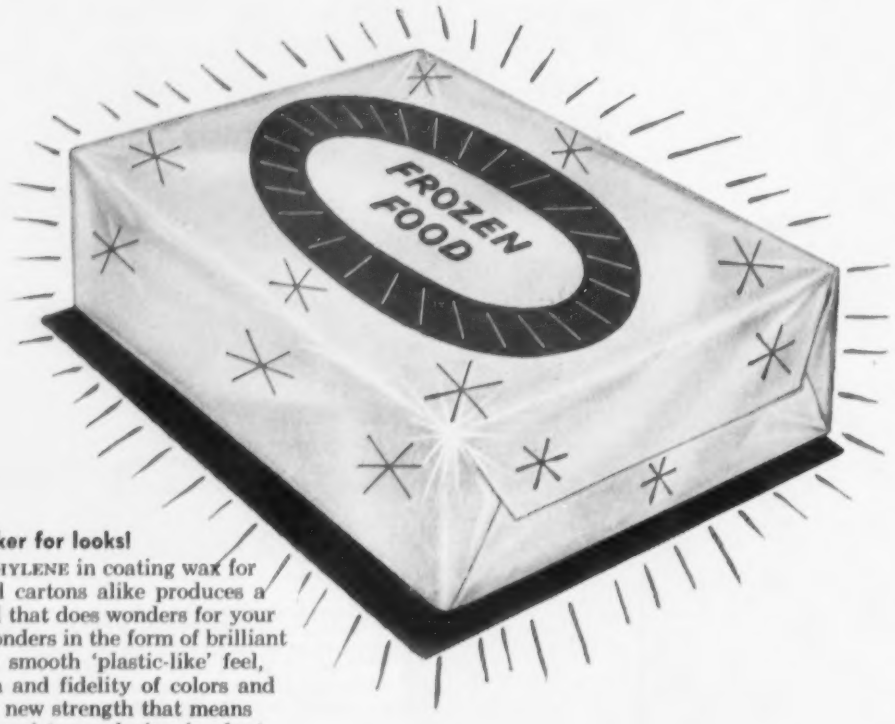
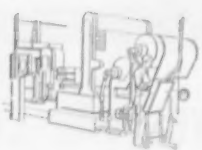


Wonder-worker for looks!
A-C POLYETHYLENE in coating wax for wrappers and cartons alike produces a coating blend that does wonders for your packages. Wonders in the form of brilliant high gloss, a smooth 'plastic-like' feel, greater depth and fidelity of colors and a remarkable new strength that means greater scuff resistance during in-plant and in-store handling.



Wonderfully workable, too
A-C POLYETHYLENE wax blends are easy to work with in your present equipment. There's minimum rub-off . . . the new high gloss is retained through hot pouring of foods, contact freezing and other handling operations.

Good news about costs!
A-C POLYETHYLENE means that your sparkling paper wrappers and containers can compete in appearance—at competitive or lower cost—with

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Briefly . . .

• **TRAINEESHIPS for graduate public health training of engineers, chemists, and other professional personnel interested in a public health career are now available, says the Department of Health, Education, and Welfare.**

• NEW ANTIBIOTIC for treating poultry is under consideration by FDA. Chas. Pfizer and Co., Brooklyn, has filed formal petition for use of Biostat oxytetracycline on the product.

• **TOMATO PASTE manufacturers have a new raw material to draw from. The latest variety, called Roma, is highly resistant to fusarium-wilt and rich in solids and red color, says USDA.**

• POULTRY PIES must contain 14% cooked meat or 25% boned, raw meat, after Sept. 1, to meet inspection labeling requirements, according to a new ruling just announced by USDA.

• **COST ENGINEERS can now join a brand-new professional organization, called American Assn. of Cost Engineers. Interested parties should contact John T. Husted, P. O. Box 1411, Trona, Calif.**

• "SEEING STRIPS" will replace conventional windows in new plant construction, according to *Power*, a McGraw-Hill publication. The new, narrow glass bands give more uniform control of lighting and increase psychological comfort for employees.

Action on Standards

Following actions have been taken by the Agricultural Marketing Service (AMS) and Food & Drug Administration (FDA) on U. S. Standards and allowable tolerances of various pesticides on raw agricultural commodities. References are to the current *Federal Register*.

Poultry, AMS proposed amended U. S. Standards, *F. R.*, July 14, p. 5249.

On grapefruit, lemons, and oranges, exemption from tolerances for ammonia, *F. R.*, July 13, p. 5235.

Veal and calf carcasses, AMS proposed amended U. S. Standards, *F.R.*, July 21, p. 5503.

Fried fish sticks, frozen, AMS proposed establishment of U. S. Standards, *F.R.*, July 21, p. 5477.

Prunes, dried, AMS proposed amended U. S. Grade Standards, *F.R.*, July 28, p. 5693.

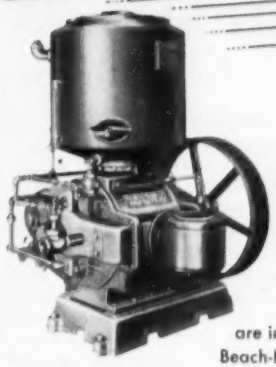
Runner-type peanuts, shelled, AMS establishment of revised U. S. Standards, *F.R.*, July 28, p. 5669.

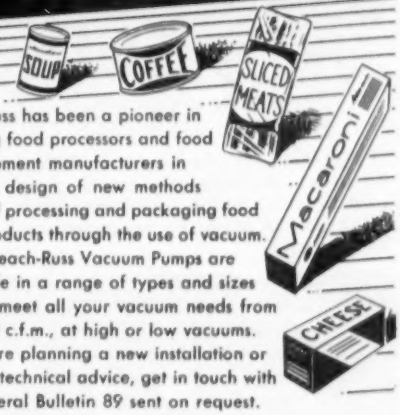
Virginia-type peanuts, shelled, AMS establishment of revised U. S. Standards, *F.R.*, July 28, p. 5671.

Blackberries, boysenberries, dewber-

from SOUP to NUTS...

BEACH-RUSS VACUUM PUMPS for ALL your food processes





Beach-Russ has been a pioneer in aiding food processors and food equipment manufacturers in the design of new methods of processing and packaging food products through the use of vacuum. Beach-Russ Vacuum Pumps are available in a range of types and sizes to meet all your vacuum needs from 1 to 1800 c.f.m., at high or low vacuums. If you are planning a new installation or are in need of technical advice, get in touch with Beach-Russ. General Bulletin 89 sent on request.

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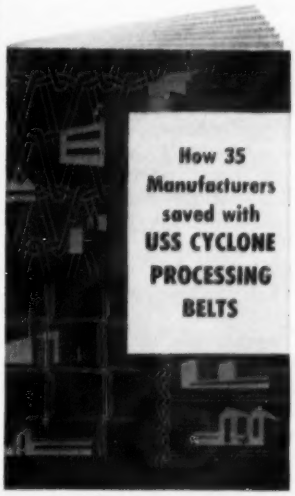

Learn how to cut production costs!

Often, high-cost, manual methods may price a product out of the market. In most of these cases, up-to-date use of a USS Cyclone Processing Belt could do much toward lowering costs by eliminating needless manual operations. If you feel that hand-processing or time-consuming production methods are adding to your production costs, send for Cyclone's Processing Belt Booklet. You'll find it's packed with facts, pictures and helpful hints on how to lower costs through the effective use of metal Cyclone Processing Belts. The booklet is yours without obligation. Just mail the handy coupon . . . today.

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UNITED STATES STEEL

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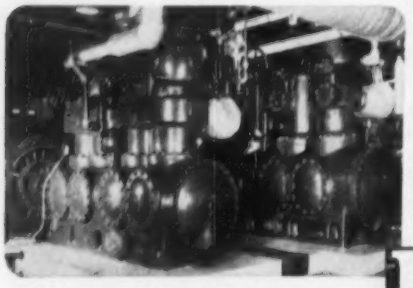
Big Esskay Plant in Baltimore

The Wm. Schluderberg-T. J. Kurdle Company operates the largest meat packing plant on the East Coast. Their Esskay brand products are recognized as top quality.



Frick 2-stage heavy-duty compressors at Esskay packing plant, Baltimore, Md.

The refrigerating system at the Baltimore plant has lately been expanded with additional Frick equipment. This includes three large compressors, operating in two stages; liquid ammonia pumps; and 18,400 feet of galvanized square-finned pipe. Results have been more than satisfactory.

When you want the ultimate in air conditioning, ice making, quick freezing, food processing or other refrigerating work, look to the nearest Frick Branch or Distributor. They offer complete A–Z engineering service, in principal cities throughout the world.

DEPENDABLE REFRIGERATION SINCE 1882

FRICK CO.

WAYNESBORO, PENNA. U.S.A.

Schedule of Events

October

4–5—American Butter Institute, annual meeting; Congress Hotel, Chicago.

4–5—Mayonnaise & Salad Dressing Mfrs. Assn., annual convention; Edgewater Beach Hotel, Chicago.

5–7—National Poultry, Butter, & Egg Assn., annual meeting; Hotel Sherman, Chicago.

6–13—International Dairy Show; International Amphitheater, Chicago.

9–11—Joint Military-Industry Packaging & Materials Handling Symposium; Wash., D. C.

9–12—American Dietetic Assn., annual convention; Palmer House, Chicago.

11-13—Dairy Plant Operator's Short Course; U. of Fla., Gainesville.

13–17—American Baker Assn., annual convention; Hotel Sherman, Chicago.

14–16—Industrial Sanitation Management Assn., Assn. of Food Industry Sanitarians, and National Assn. of Bakery Sanitarians, international sanitation maintenance show & conference; Coliseum, New York City.

14–16—Brewers' Assn. of America, annual convention & exhibit; Edgewater Beach Hotel, Chicago.

17–19—Annual Antibiotic Symposium; Willard Hotel, Wash., D. C.

17–19—National Pickle Packers Assn., annual convention & machinery exhibit; Edgewater Beach Hotel, Chicago.

18–20—National Pretzel Institute, annual convention; Warwick Hotel, Philadelphia.

21–25—National Protective Packaging & Materials Handling Exposition; Kiel Auditorium, St. Louis.

22–26—National Safety Congress, annual convention; Conrad Hilton Hotel, Chicago.

24–26—Assn. of Food Industry Sanitarians, annual meeting; Hotel Casa Munras, Monterey, Calif.

28–N3—Dairy Industries Supply Assn., annual meeting (28) and exposition; Traymore Hotel and Convention Hall, Atlantic City.

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ries and loganberries, canned, AMS proposed amended U. S. Standards, F.R., August 3, p. 5806.

Nuworld cheese, effective date of Definition and Standard of Identity, F.R., August 2, p. 5773.

Mozzarella cheese, Scarmoze cheese, part-skim Mozarella cheese, part-skim scarmoze cheese, ricotta cheese, and part-skim Ricotta cheese, proposed Standards of Identity, F.R., August 1, p. 5747.

Poultry, uncooked, proposed tolerances of oxytetracycline, F.R., August 9, p. 5971.

On certain raw agricultural commodities, exemption from tolerances in post-harvest use of piperonyl butoxide, pyrethins, and allethrin, F.R., August 9, p. 5966.

On cranberries, hazelnuts, hickory nuts, horseradish, parsnips, pecans, peppers, pimentos, rutabagas, and walnuts, tolerances of Toxaphene, F.R., July 17, p. 5315.

On cherries, lettuce, and spinach, tolerances of diethyl diphenyl dichloroethane, F.R., July 19, p. 5410.

On apples, cabbage, cherries, and pears, proposed tolerances of Diazinon, F.R., July 24, p. 5537.

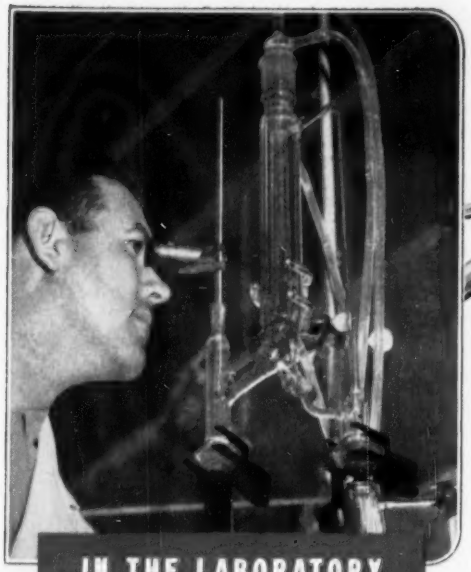
On grapefruit, melons, and oranges, exemption from tolerances of ammonia, F.R., July 26, p. 5619.

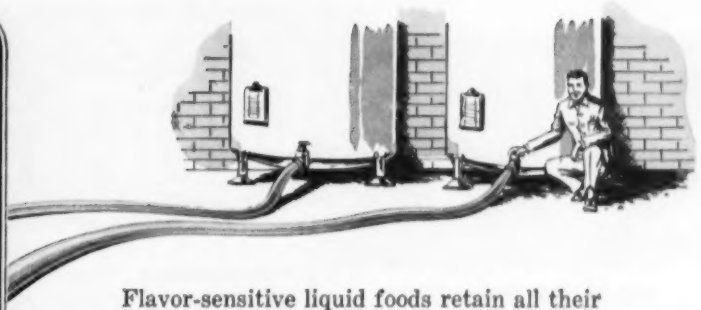
On barley, corn, oats, popcorn, rice, rye, sorghum, and wheat, exemption from tolerances of carbon disulfide, carbon tetrachloride, ethylene dibromide, and ethylene dichloride, F.R., July 26, p. 5620.

On asparagus, barley, blackberries, boysenberries, carrots, collards, corn, currants, dandelions, dewberries, endive, figs, garlic, gooseberries, guavas, horseradish, kohlrabi, leeks, loganberries, mushrooms, nectarines, oats, parsley, parsnips, pecans, peppermint, pumpkins, quinces, radishes, raspberries, rice, rye, salsify, shallots, spearmint, swiss chard, water cress, walnuts, wheat, meat, and chicken eggs, proposed tolerances of Malathion, F.R., July 31, p. 5724.

On sweet potatoes and fat of meat, tolerances of DDT, F.R., July 31, p. 5717.

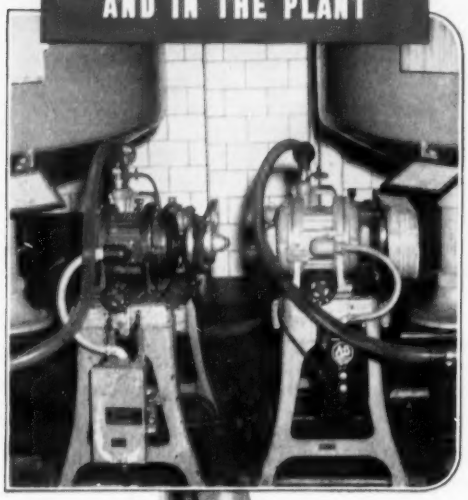
On barley, corn, oats, popcorn, rice, rye, sorghum, wheat, beans, bitter melon, cavendish bananas, citrus, fruits, cucumbers, guavas, mangoes, papayas, peppers, pineapples, and zuccini squash, tolerances of ethylene dibromide, F.R., August 11, p. 6046.





IN THE LABORATORY

AND IN THE PLANT



Flavor-sensitive liquid foods retain all their purity and flavor when piped through Tygon Flexible Plastic Tubing. There is no contamination — no metallic flavor pick-up. Tygon is completely safe for foods because it is chemically inert, non-toxic and resistant to all food acids and alkalies. This has been proven in use in scores of food processes. Small wonder that

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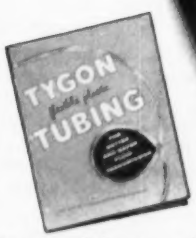
leading authorities everywhere have approved Tygon Tubing for use with food products.

This versatile piping medium provides faster, low cost installation too, because it may be installed in long continuous runs without joints or couplings. Flexible, it easily adapts to any layout, and its glass-like clarity provides instant visual inspection of flow at any point. The polished bore, plus the absence of joints and sharp turns, eliminates clogging (especially in the case of semi-solids) and increases flow rates. Even cleaning is easier: Tygon lines may be disassembled, cleaned or steam sterilized—and reassembled in minutes!

Fifty-five bore sizes (1/16" to 2" I.D.) accommodate virtually every plant or laboratory requirement. Simple clamp fittings make for fast, easy coupling and special types of Tygon are available for special service such as vacuum or pressure work.



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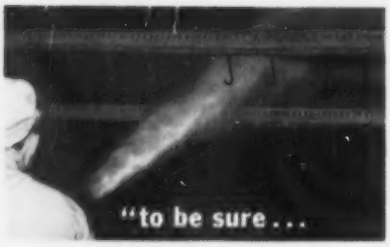

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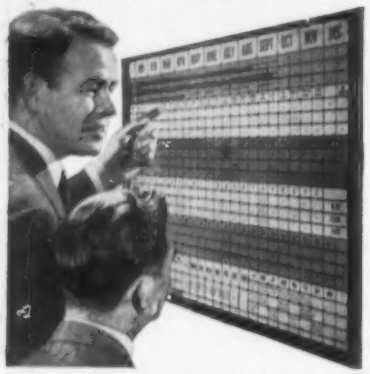

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Wheel-Design Plant

—*Continued from page 65*

ard-type instant-delivery system. Materials will move from the various locations to the digestors by pump. Bones will be handled on conveyors.

There will be clear ground-floor areas for preparing smaller items, canning operations, bacon production, and processing of byproducts—no cluttering by any structural columns. And with this layout, manufacturing processes may be varied at will. Shipping of finished goods will proceed from loading docks set both in corners between the sections and midway in sides.

In movements within the plant, cross traffic will be avoided by multiple loading bays around the perimeter of the plant.

Excellent cross ventilation will be provided, irrespective of wind direction, in all large ground-floor processing areas.

Diameter measurement of the six-side structural layout is blueprinted as 440 ft. The two end sections have 220-ft.-wide outer faces, while those of the other three sections scale 260 ft. (sixth section is open for access of the ramp). The 70-ft.-span hexagonal central hub will have its 40-ft. sides opening into the spokes, each of which are to be 40-ft. wide.

Initially, the plant will have two stories, stressed to take two more floors if demanded. (Note that the photo of the model shows a third story on two of the spoke-wings.) The ground floor will be set 3½ ft. above the surrounding ground level. And there will be a clear wall height of 14 ft. on each floor.

The construction will exploit the latest concrete building techniques. All structural concrete, apart from foundations, will be factory-made components. In brief, the structure will be entirely prefabricated prior to erection, and it will be stressed after casting. Fast construction is essential, since whole sections will have to be completed between seasonal peaks.

To cut down dead-weight of concrete, the 40-ft.-span floor and roof beams will be precast to carry their own weight and then stressed subsequent to erection in order to enable them to support the substantial loadings. The whole structure will then be locked together by post-stressing a continuous lintel at each floor level.

Other than the labor required on foundations, roads, and landscaping, the only on-site work will be provision of the various fittings and service facilities, along with plastering, floor surfacing, and window glazing. Erection time is thus seen halved, with costs greatly reduced accordingly.

Examination of the plant model (photo) reveals how series of 10-ft. modern bays will distinguish the exterior faces of the structure, including the sides of the spoke-wings facing the inner areas of the wheel.

Between the outer-bay columns, glass and ventilation panels will extend from 6 ft. above floor level to the underside of the ceiling structure. Half of these panels will be fixed, glassed louvers.

End (Resume reading on page 66)

Precise Sugar Density

—*Continued from page 63*

Tank 3 because flow rates varied considerably. This problem, however, was solved by a unique way of making the system flow responsive.

Water addition to this tank is now controlled by a combined flow-and-density signal. The flow signal is provided by a Brown flow transmitter installed in the inlet line to the dilution tank. The pneumatic output from this transmitter is combined with the output from the density controller in an averaging relay (output equals the average pressure of the two input pressures) and the resulting signal is used to control the water valve opening.

This arrangement, though not as accurate as the use of two flow-responsive devices and a ratio controller, provides sufficient response to obtain adequate control under the flow conditions encountered in this system.

The Brown level controllers (throttling type) pneumatically position butterfly valves in the outlet lines from the tanks. Overflow protection is provided by shut-off switches that close the tank inlet valves or shut down the sugar scroll in case of high level.

The Taylor temperature controllers also are of the throttling type. Product temperature in Tanks 1 and 2 is maintained continuously at 80 deg. C. to provide the heat necessary for solution and, of equal importance, the even temperatures required for accurate density measurement.

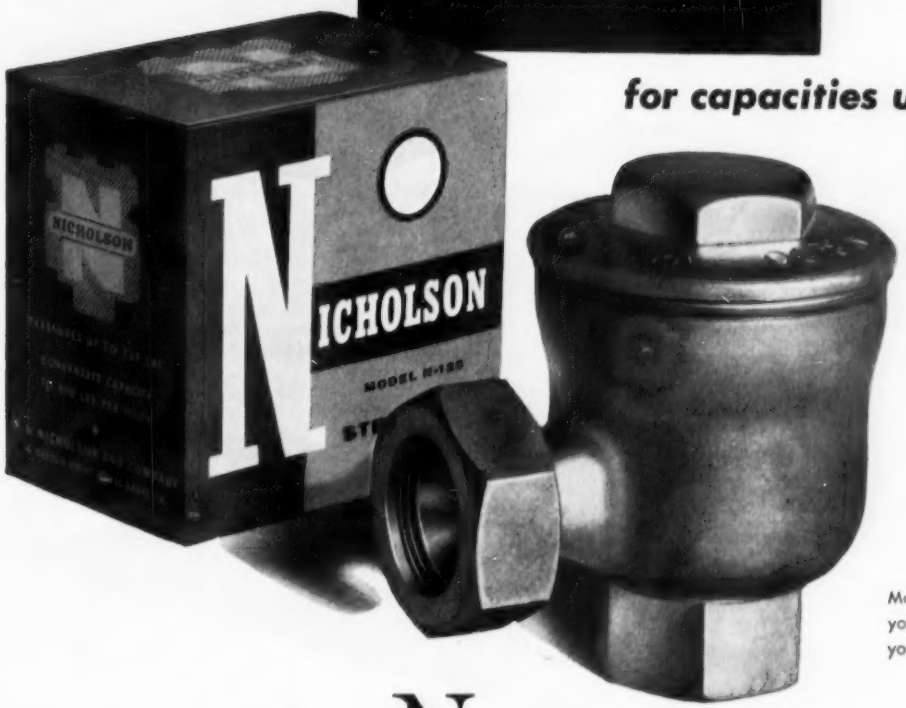
Steam is injected directly into Tank 1. Coils are used in Tank 2 to prevent unnecessary dilution. The 66.5%-solids material in Tank 3 is not heated, since the temperature of the incoming material is sufficiently uniform to obtain the density control required.

The finished product is cooled to 38 deg. C. in a heat exchanger before being pumped to storage.

End (Resume reading on page 64)

a new NICHOLSON STEAM TRAP

for capacities up to 800 lbs.



Model N-125 available through your local distributor, as well as your Nicholson representative.

Now you can have all of the operating advantages of Nicholson design simplicity and rugged construction in the new, competitively priced Model N-125 steam trap for lower capacity applications.

Like other traps in the Nicholson line . . . it combines a unique thermostatic bellows, large orifice, and fast, intermittent valve action to assure effective and economical discharge of condensate and air from steam lines and equipment.

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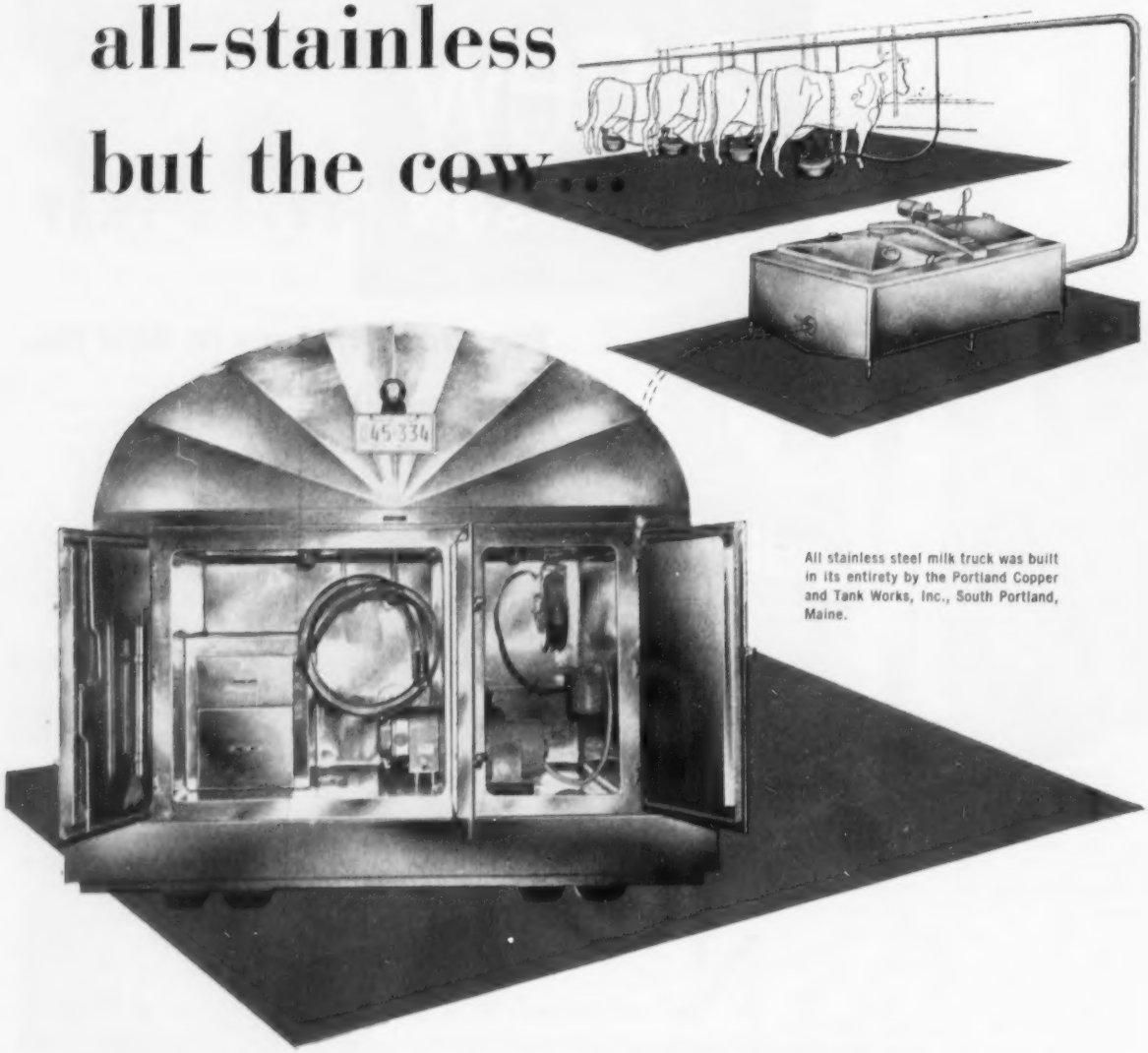
all-stainless but the cow...



All stainless steel milk truck was built in its entirety by the Portland Copper and Tank Works, Inc., South Portland, Maine.

Milking machine – to storage tank – to milk truck . . . it's *stainless* all the way. With good reason. For nothing surpasses stainless steel for sanitary milk handling, flavor protection, easy maintenance, and life-time good looks.

The manufacturer of this tank truck summed it up well when he said: "Stainless steel was used on the inner liner because it's *easy to keep clean*, and also passes food laws. It was used on the outer shell because stainless is *maintenance free*, for an indefinite time."

For faster milk handling . . . protection from contamination . . . longer-lasting equipment, *make it stainless*. Your nearby Crucible representative can recommend the best grades and types for your special application. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

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Recent Inventions

PRODUCTS

Salt Composition Consisting of Common Salt, Inorganic Trace Minerals, Liquid Polyhydric Alcohol—H. W. Diamond to Morton Salt Co., Chicago. No. 2,744,823. May 8, 1956.

Dried Egg Whites by Fermenting Liquid Whites, Separating, Acidifying, Adding Glycerine, Drying—B. M. Shaffer to B. R. Harris, Chicago. No. 2,744,829. May 8, 1956.

Margarine by Mildly Cooling and Agitating Initial Fat Stock, Supercooling, Blending With Aqueous Ingredient — S. I. Shafer, Melrose and A. R. Gudheim, Petersham, Mass., and W. H. Schmidt, Englewood, N. J., to Lever Bros. Co., New York City. No. 2,745,750. May 15, 1956.

Non-Reverting Soybean Oil by Hydrating and Removing Portion of Phosphatides, Steam-Deodorizing— E. F. Werly to Pillsbury Mills, Minneapolis. No. 2,746,867. May 22, 1956.

Fluid Shortening Comprising Vegetable Oil, 2-10% Baking Improver—S. T. Cross, Elsmere, Del., and W. C. Griffin, W. Chester, Pa., to Atlas Powder Co., Wilmington. No. 2,746,868. May 22, 1956.

Condiment Consisting of Pulverized Spices, Salt, Onion, Coconut Juice, Peanut Oil—G. Ellis, San Francisco. No. 2,746,869. May 22, 1956.

Lard Antioxidant Employing Mixture of 2-Tertiary and 3-Tertiary Butyl-4-Hydroxyanisoles—H. R. Kraybill, to American Meat Institute Foundation, Chicago. No. 2,746,870. May 22, 1956.

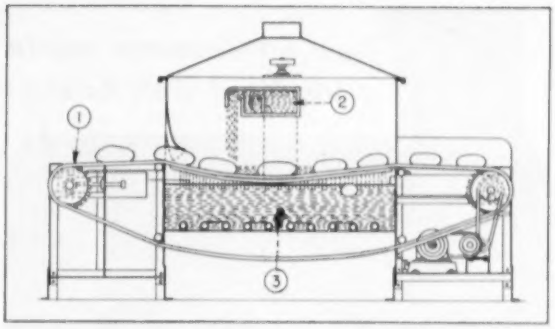
PROCESSES

Forming Butterhorns by Conveying Dough Between Laterally Spaced, Reciprocating Blocks—L. C. Stiles, Seatle. No. 2,742,868. Apr. 24, 1956.

Processing Cheese by Immersing Drained Curd in Edible Acid Solution, Heating to 90-120F.—N. Kraft, Northbrook, Pa. and P. J. Ward, Mt. Prospect, Ill. to Kraft Food Co., Chicago. No. 2,743,186. Apr. 24, 1956.

Extracting Gelatin From Stock by Soaking in Strong Acid, Extracting With Hot Water, Adjusting pH of Aqueous Gelatin Phase—L. E. Garono, Army Chemical Center, Md., F. Kramer, Forest Hills, N. Y., and A. E. Steigmann, Stoneham, Mass., to General Foods Corp., New York City. No. 2,743,265. Apr. 24, 1956.

Want more information on any of these recent patents—if so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers of those you want and enclosing 25¢ for each copy.



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Packaged and ready for market! Processors of both canned and frozen foods have found that Ac'cent gives their products a competitive edge on flavor.

Business up 85% in 2 years!

THE four smiling faces on the 4 Fishermen package are reflected many times in the sales department of Fulham Brothers, of Boston and Portland. Sales of their frozen fishsticks have been climbing in an amazing fashion since their introduction in 1954.

One contributing reason is the use of Ac'cent, to build and hold flavor in the cod and haddock. Fulham Brothers buys prepared batter and breading containing Ac'cent. They also add 4 ounces of Ac'cent to every 18 pounds of batter to insure consumers of the finest flavor and to promote repeat business for 4 Fishermen.

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De-Sugaring Foods Containing Glucose and Protein by Treating With Enzyme, Hydrogen Peroxide—R. R. Baldwin, E. Orange, N. J., to D. L. Sarett, Chicago. No. 2,744,017. May 1, 1956.

Inhibiting Spoilage in Cheese With Nisin-Producing Bacterial Cultures—A. T. R. Mattick and A. Hirsch, Shinfield, England, to National Research Development Corp., London. No. 2,744,827. May 8, 1956.

Improving Dried Egg Whites by Subjecting Liquid Whites to Ultraviolet Rays Before Fermenting—M. M. Gladstone, Chicago, and B. R. Harris, Glencoe, Ill., to B. R. Harris, Chicago. No. 2,744,828. May 8, 1956.

Processing Cocoa Beans by Preliminary Roasting, Shelling, Treating Nibs With Alkaline Solution, Roasting—H. E. Jones, Cambridge, Mass. No. 2,745,746. May 15, 1956.

Fining Beverages by Adding Inositol Compound, Agitating, Separating—K. Hennig, Geisenheim, Germany. No. 2,745,747. May 15, 1956.

Sterilizing Foods in Containers by Filling to Brim With Liquid, Attaching Liquid-Tight Expansion Chamber, Heat-Processing, Removing Expansion Chamber, Closing—E. R. Anderson, Campbell, Calif. No. 2,745,755. May 15, 1956.

Improving Malt Germination by Seeping Grain for 20-40 Hr., Then Subjecting to High Frequency Ultrasonic Irradiation—W. Specht, Ludwigstadt, and H. Schultheis, Weissenthurm, Germany. No. 2,745,789. May 15, 1956.

Rendering Animal Fats Continuously by Coarsely Grinding Fats Containing Tissue, Melting, Removing Fat, Heating to Coagulate Protein, Grinding—W. R. Dayen and K. M. Christensen, Indianapolis, to Hygrade Food Products Corp., Detroit. No. 2,745,856. May 15, 1956.

Molding Bread Dough Continuously by Pre-Sheeting to Form Flat Elongated Strip, Turning 90 Deg., Curling, Pressure Rolling—F. F. Hansen, Pittsburgh. No. 2,746,403. May 22, 1956.

Inhibiting Caking of Soluble Coffee by Adding Lactose, Finely Divided Calcium Gluconate—S. Lee, Fair Lawn, N. J., to American Home Products Corp., New York City. No. 2,746,866. May 22, 1956.

Preserving Citrus Fruit by Packaging in Paper Treated with Diphenyl, Citrus Oil—R. G. Mispley, Camas, Wash., and J. R. MacRill, Ontario, Calif., to Crown Zellerbach Corp., San Francisco. No. 2,746,872. May 22, 1956.

PACKAGING

Case Marker Including Conveyor, Reciprocating Carriage, Printing Head, Actuating Means—J. P. Hounsell, Hood River, Ore. No. 2,742,854. Apr. 24, 1956.

Can Divider Having Inlet, Outlet Runways, Rotary Turret, Detector, Diverting Means—R. E. J. Nordquist, Summit, N. J., to American Can Co., New York City. No. 2,743,001. Apr. 24, 1956.

Filling Carbonated Beverages by Successive Additions of Flavoring, Covering Water, Gas-Charged Water Under Pressure—L. Clarke, Heaton Mersey, Stockport, to Bratby & Hinchliffe, Ltd., Manchester, England. No. 2,743,047. Apr. 24, 1956.

Produce Shipping Box With One-Piece Divider of Inverted V-Shaped, Hinged Rectangular Sections, Integrally Hinged Floor and End Panels—W. B. Crane, Woodland Hills, Calif., to Allied Plastics Co., Los Angeles. No. 2,743,050. Apr. 24, 1956.

Fruit-Wrapping Unit Comprising Vertical Tube, Wrapping-Sheet Feeder, Rotatable Ring, Resilient Fruit-Engaging and Wrap-Twisting Means, Non-Rotating Holding Ring—W. S. van Dok, Enkhuizen, Netherlands. No. 2,743,564. May 1, 1956.

Packaging Dried Fruit by Making Bag From Heat-Sealable Thermoplastic Web, Coating Fruit With Phosphatide Water Solution, Drying, Inserting Fruit, Sealing—J. E. Snyder and R. J. Swartz, Akron, Ohio, to Goodyear Tire & Rubber Co. No. 2,744,019. May 1, 1956.

Packaging Sausage Links by Rotating Rectangular Supporting Blank to Wind Thereabout a Length of Filled Sausage Casing Linking, Aligning Links on Blank, Folding, Overwrapping—O. F. Seiferth, Madison, Wis., to Oscar Mayer & Co., Chicago. No. 2,744,020. May 1, 1956.

Bottle Capper Consisting of Turret, Conveyor, Transfer Device, Latch Member, Cap-Transfer Mechanism—I. L. Wilcox, Fulton, N. S. Cole, Baldwinsville, and H. Pesch, Fayetteville, N. Y., to Oswego Falls Corp., Fulton, N. Y. No. 2,744,367. May 8, 1956.

Bag Filler Including Package-Gripping and Advancing Means, Dispenser, Splitter Bar Having Orifice, Gas-Charging Means—C. B. Harker to Bartelt Engineering Co., Rockford, Ill. No. 2,745,583. May 15, 1956.

Valve Bag Having Multi-Ply Paper Body, Longitudinal Gusset, Top-Corner Valve Apron—W. W. Hahn, New Hope, and R. H. Brodt, Nazareth, Pa., to Universal Paper Bag Co., New Hope. No. 2,745,594. May 15.

Confectionery Package Comprising Open-End Case With Top Severable From Sides, Flaps With Spaced Perforations, Slidable Inner Members—E. H. Lorenzsonn, Mellrichstadt, Germany, to Publishers Printing Co., Louisville, Ky. No. 2,745,596. May 15, 1956.

Packet for Individual Portions of Powdered Sugar Having Annular Compartment With Spaced Top and Bottom Walls, Radial Ribs, Axial Shaft, Tearing Pointer—J. A. Pichardo, New York City. No. 2,745,751. May 15, 1956.

Soft-Plastic Container With Open-Top Compartment, Flange, Severable Plastic-Film Cover—L. Peters, Evanston, Ill. No. 2,745,752. May 15.

EQUIPMENT

Side-Dumping Box (for Use With Lift Truck) Having Bottom Member Hingedly Connected to Rear Wall, Horizontal Flange Portions, Vertical Stop—L. W. Shea, J. C. Streb, and G. B. Bole, to Union Metal Mfg. Co., Canton, Ohio. No. 2,741,382. Apr. 10, 1956.

Poultry Scalder Employing Elongated Cylinder With Swingable Lid, Basket on Rotatable Shaft, Open-Top Hopper—R. S. Zebarth, Hickman Mills, to Gordon W. Johnson Equipment Co., Kansas City, Mo. No. 2,741,795. Apr. 17, 1956.

Candy Machine for Depositing Fruit Pieces Into Soft-Center Confections Including Hopper, Retainer With Sockets, Means for Moving Molds Under Sockets—F. D. Luteran, Dearborn, Mich. No. 2,741,999. Apr. 17, 1956.

Chocolate-Paste Extruder With Carrier Above Conveyor, Supply Container, Pump, Nozzle—J. M., S. F. M., and E. M. Hansen to A/S Toms Laboratorium, Copenhagen, Denmark, No. 2,742,000. Apr. 17, 1956.

Peach Pitter Comprising Apertured Flat Plate, Fruit-Holding Means, Concentric Shafts, Knife, Actuating Means—E. W. Carroll, Redwood, to S & W Fine Foods, Inc., San Francisco. No. 2,742,066. Apr. 17, 1956.

Cherry Stemmer Consisting of Conveyor, Chute, Stem-Gripping and Interlocking Means, Flexible Wiper—H. E. Metcalf, Los Angeles, to S & W Fine Foods, Inc., San Francisco. No. 2,742,068. Apr. 17, 1956.

Melon-Ball Cutter Having Frame-Mounted Arcuate Blades Rotating Independently About Common Axis, Drive and Synchronizing Means—G. R. Lum, S. Wilton, Conn. No. 2,742,069. Apr. 17, 1956.

Falling-Film Evaporator Including Jacket, Tube Sheet, Frusto-Conical Skirt, Central Support, Conical Baffle, Vanes—R. O. Henszey, Oconomowoc, Wis. No. 2,742,083. Apr. 17, 1956.

Granual-Material Feeder Employing Supply Bin Having Lower Opening, Integral Upwardly Open Casing, Removable Plate—C. R. Ethier to George M. Pendergast & Co., Milwaukee. No. 2,742,203. Apr. 17, 1956.

Oven Conveyor With Articulated Plates, Oblique Metallic Members Forming Spaced-Apart Pan-Holding Depressions—M. Cohen to Interstate Bakeries Corp., Kansas City, Mo. No. 2,742,869. Apr. 24, 1956.

Combination Meat Cutter, Mixer, and Extruder Comprising Casing, Annular Ribs, Shaft-Mounted Disk-Shaped Blades, High-Speed Drive—H. Herzer to Bell Aktiengesellschaft, Basel, Switzerland. No. 2,742,937. Apr. 24, 1956.

Continuous Crystallizer Consisting of Tank, Agitator, Heat-Transfer and Product Recirculation Means—E. W. Kopke to Ultra-Sucro Co., New York City. No. 2,743,198. Apr. 24, 1956.

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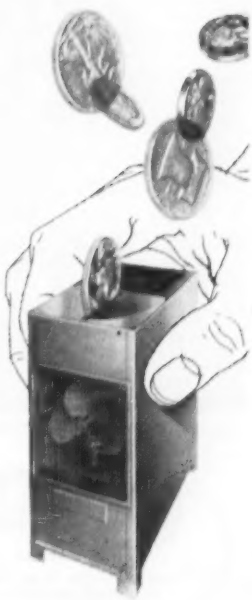
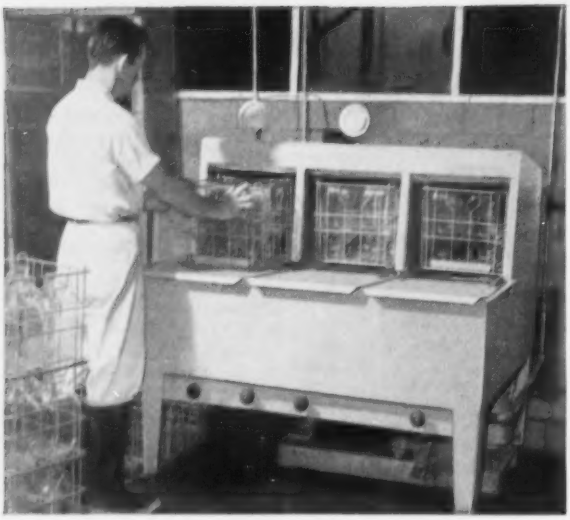


Water saved is money earned—and a Marley Cooling Tower will save more than 95% of the water required by refrigeration equipment. This saving runs into big money fast when you consider that even 15 tons of refrigeration requires about 65,000 gallons a day.

Down time is expensive—and that's why continuity of cooling tower operation is just as important as economical reuse of water. Marley Cooling Towers have a reputation of 30 years standing for continuous, dependable service at minimum maintenance and upkeep cost. They conform with local water conservation ordinances, so that even in periods of critical water shortage systems equipped with Marley Cooling Towers continue operation without restriction.

Marley makes the world's most complete line of water cooling towers for refrigeration. In this complete line you are sure to find a unit of just the right type and size to stop those "water leaks" that are dribbling your profits down the drain. For a survey of your situation without cost or obligation, call your Marley Application Engineer in any of 50 cities.

MARLEY *the Marley Company* Kansas City, Missouri



Here's the low-cost way to clean and fill gallon jugs

One-Man Cleaning. With a Cherry-Burrell 42nd Washer, one operator can pressure wash, rinse, sterilize a full case of gallon jugs and all other standard bottles—every 40 seconds. Three-compartment design gives every bottle and every case (1) a hot alkali scouring under pump pressure; (2) a clear water pump pressure rinse; (3) a steam or chlorine sterilization.

One-Man Filling. And for short-run production lines, one man—with a Cherry-Burrell "Han-D" Filler—can easily hand fill, cap and case up to 6 gallons per minute . . . handle all standard bottle sizes at regular 2-valve filling speeds.

For further information, see your Cherry-Burrell Representative or write for literature.

CHERRY-BURRELL CORPORATION

427 W. Randolph Street, Chicago 6, Ill.

Dairy • Food • Farm • Beverage • Brewing • Chemical • Equipment and Supplies

SALES AND SERVICE IN 58 CITIES—U.S. AND CANADA

Cereal-Processing Unit Comprising Shredding Rollers, Slitter, Forming Rolls—D. Hale, University City, Mo., and E. J. Carpenter, Battle Creek, Mich., to Ralston Purina Co., St. Louis. No. 2,743,685. May 1, 1956.

Fish-Skinning Unit Having Feed Conveyor, Resilient Gripping Means, Endless Presser Belt, Circular Knife—A. L. Christiansen, Compton, Calif., to W. S. Simpson, Los Angeles. No. 2,744,285. May 8, 1956.

Cheese Storage Rack Including Frame With Upper, Lower Longitudinal Members That Rotate Within Cheese Holder Having Horizontal Upper, Lower Shelves—J. G. R. Eales, Dudley, and E. Hale, Kempshott, Basingstoke, to Co-operative Wholesale Society Ltd., Manchester, England. No. 2,744,325. May 8, 1956.

Slicing Machine Solenoid Controlled to Regulate Number of Slices Per Group—J. Folk to U. S. Slicing Machine Co., La Porte, Ind. No. 2,744,553. May 8, 1956.

Fruit-Inspection Unit With Synchronized Conveyors, Product Orientation, Transfer, and Rejection Means—J. M. Hait to Food Machinery & Chemical Corp., San Jose, Calif. No. 2,744,613. May 8, 1956.

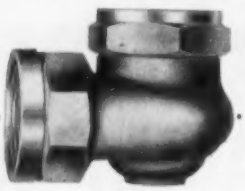
Sanitary Flour-Handling Unit Comprising Sectional Tubular Conveyor Engaging Cylindrical Flange—L. Davis, N. Hollywood, and J. B. Paulsen, Pasadena, Calif., to Read Standard Corp. No. 2,744,620. May 8, 1956.

Continuous Dryer Consisting of Inclined Trough-Shaped Belt, Hot-Gas Chamber, Upper Feed and Lower Discharge Means—E. Lowe, El Cerrito, and W. C. Rockwell, Richmond, Calif., to USA. No. 2,745,194. May 15, 1956.

Continuous Freezer Employing Refrigerant Casing With Apertured Baffle Plate, Mixing Drum, Vapor Chamber—C. W. Merrill, Logan, Utah. No. 2,745,261. May 15, 1956.

Flour-Bleaching Unit Including Enclosure Shell, Top Feed Opening, Gas-Injecting Means, Suspended Dispersing Body—F. M. Abbott, Monterey Park, D. C. Balsley, Los Angeles, and H. F. Bamesberger, Anaheim, Calif., to General Mills, Inc. No. 2,746,375. May 22, 1956.

SPRAYING SYSTEMS CO.



for lower cost

and better performance

SPRAY NOZZLES

Modern design. Precision machining. All materials. Thousands of standard industrial spray nozzle types and sizes to choose from. Years of proved experience at your service.

write for this great new catalog today

Ask for our new 48 page Catalog No. 24 . . . the most comprehensive spray nozzle catalog ever produced. Yours for the asking.

SPRAYING SYSTEMS CO.

3212 Randolph Street • Bellwood, Illinois

Another

famous brand name cuts packaging costs with STOKES & SMITH Automatic Fillers!

At McCormick & Company, Inc.

Stokes & Smith Model HG-86-87 Automatic Tandem 4-Station Fillers have increased average accuracy of fill to consistently close tolerances. From "fluffy" cinnamon to "oily" nutmeg, they fill 120 or more containers per minute in a range of volumes from ½ to 4 ounces.

Whether your product is a sticky powder, free-flowing granules or hard-to-manage flakes, the versatile Model HG-86-87 Automatic Filler will reduce your packaging costs by increasing accuracy of fill at high speed. It fills cans, jars or cartons by volume, gross weight or auger-vacuum in sizes ranging from 1½" to 6" wide, 1½" to 4" thick, and 1½" to 8" high. It is ideally suited not only for spices and other foods but for drugs and cosmetics as well.

5 Cost-Cutting Advantages

Average Accuracy — plus or minus 1% for most products.

Versatility — handles a wide variety of products.

Adjustability — quick, easy changeover from one product or container size to another.

Speed — up to 145 containers per minute.

Cleanliness — auger, hopper, dust tube design assures dust-free fill.

For further details and specifications, write to:

STOKES & SMITH CO.

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Pacific Coast: SIMPLEX PACKAGING MACHINERY, INC., 534–23rd AVE., OAKLAND 6, CALIF.

SUBSIDIARY OF FOOD MACHINERY AND CHEMICAL CORPORATION

It's the Nash!

The ability of Nash Compressors to maintain original performance over long periods is no accident. Nash Compressors have but a single moving element, the Nash Rotor. This rotor is precision balanced for long bearing life, and it revolves in the pump casing without metallic contact. Internal lubrication, frequent cause of gas contamination, is not employed in a Nash. Yet, these simple pumps maintain 75 lbs. pressure in a single stage, and afford capacities to 6 million cu. ft. per day in a single compact structure.

Nash Compressors have no valves, gears, pistons, sliding vanes or other enemies of long life. Compression is secured by an entirely different principle of operation, which offers important advantages often the answer to gas handling problems difficult with ordinary equipment.

Nash Compressors are compact and save space. They run without vibration, and compression is without pulsation. Because there are no internal wearing parts, maintenance is low. Service is assured by a nation-wide network of Engineering Service offices. Write for bulletins now.

- No internal wearing parts.
- No valves, pistons, or vanes.
- No internal lubrication.
- Low maintenance cost.
- Saves floor space.
- Desired delivery temperature Automatically maintained.
- Slugs of liquid entering pump will do no harm.
- 75 pounds in a single stage.

NASH ENGINEERING COMPANY

312 WILSON, SO. NORWALK, CONN.

Men & Companies

L. to r.: **Charles W. Lubin,** Sara Lee's pres., **Nathan Cummings,** board chairman, Consolidated, and **S. M. Kennedy,** Consolidated's pres., break cake on agreement under which Consolidated Foods Corp. acquired Kitchens of Sara Lee, Inc.

Industry

Adolph's Ltd, will build a $1 million block-long structure to house a research laboratory, test kitchen, and all company offices, in Burbank, Calif.

Borden Co. announces plans to build a $1 million research and development center in Syracuse, N. Y.

Campbell Soup Co. Ltd., New Toronto, Ont. plans a $3 million soup manufacturing plant in Winnipeg, Man.

Capital Coca-Cola Bottling Co., Raleigh, N. C., is building a 60,000 sq. ft. plant outside the city.

Diamond Walnut Growers, Inc. has constructed a 100 million lb. capacity walnut processing plant at Stockton, Calif.

Dole Hawaiian Pineapple Co.'s new $2,500,000 can manufacturing plant estimated output 365 million cans per yr.—is now in full operation at Honolulu.

Dugan Bros. has completed the first unit of new plant in Queens Village, N. Y.—total plant capacity to be 2,500 loaves per hr.

Fritos Co. announces purchase of controlling interest in Texas Tavern Canning Co., Seguin, Tex.

General Foods Ltd., Cobourg, Ont., has added 90,000 sq. ft. of floor space for manufacture of desserts and soft drinks.

Pepsi-Cola Co., Washington, D. C., will build a $1 million bottling plant in Maryland.

Shirriff-Horsey Corp. Ltd., Toronto, has purchased Crawford Co. Ltd., C. S. Allen & Co., and A. W. Gilmore Co.—firms manufacturing and merchandising candy, toffee, nuts, cocoa, and cocoa products.

Young's Market Co. starts construction on new general office facilities, a meat-mayonnaise factory, and a wines and spirits warehouse in Los Angeles.

Personnel

Saul S. Blumenthal has been appointed to serve as director of research for Dietetic Food Co., Inc., Brooklyn.

Dr. James A. Bralley has been named director of research for A. E. Staley Mfg. Co., Decatur, Ill.

George E. Brissey is associate director of research at Swift & Co.

Richard A. Brown, pres. U. S. Cocoa Corp., Camden, N. J., is new chairman of board Jamaica Cocoa Products, Ltd., Kingston, Jamaica.

Edward J. Bush, and J. W. Daniel have been elected vice-presidents Central Distributing Div., Consolidated Food Corp.

Minos Asproyerakas is new

. . . AND
Clinton's famous
for service, too

CLINTON HOUSE
Menu
FOR TODAY

LUNCHEON SUGGESTIONS

BIG SLICE OF SOUTHERN BAKED HAM* garnished with pineapple* rings . . . whipped potatoes & gravy* . . . whole-grain corn* . . . fresh roll* & butter . . . coffee or tea

THICK CORNED BEEF* SANDWICH . . . choice of fruit cocktail*, salad* or cream of mushroom soup* . . . cherry pie* . . . coffee or tea

TWO FRESH EGGS AND BACON* STRIPS . . . toast* & jelly* . . . steaming coffee or tea

ASSORTED COLD CUTS* . . . french fries* . . . sweet pickle* slices . . . bread* & butter . . . coffee or tea

A LA CARTE

Cream-Style Corn* String Beans* Creamed Peas*

SALADS
Diced Fruits*
Tomato Slices on Lettuce
Fruit Gelatin*
Cottage Cheese on Peach*

DESSERTS
Choice of Fresh Pies*
Ice Cream*
Choice of Pudding*
Assorted Candies*

BEVERAGES
Coffee — Tea — Milk — Bottled Beer*

* FOODS ENHANCED WITH CLINTON PRODUCTS FROM CORN:

Clinton® CORN STARCH
CORN SYRUP
REFINED CORN OIL

If you don't find what you want on the menu — just ask for it. From soup to dessert, Clinton products from corn have been serving packers, canners, bakers, candy makers, brewers and ice cream makers for years and years.

When a food processing problem calls for starches, syrups or dextrose . . . have Clinton give you a big serving of their technical service.

As a Clinton "regular" you'll join a clientele that includes some of the biggest food names in America. To insure promptness call on Clinton.

Quality products
FROM THE WORLD'S CORN CENTER
CLINTON
CLINTON CORN PROCESSING COMPANY
CLINTON, IOWA

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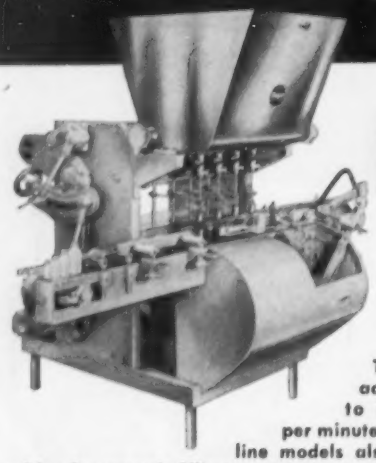
Immediate Savings . . . WITH



Hope

ESTABLISHED SINCE 1908

TYPE 19A

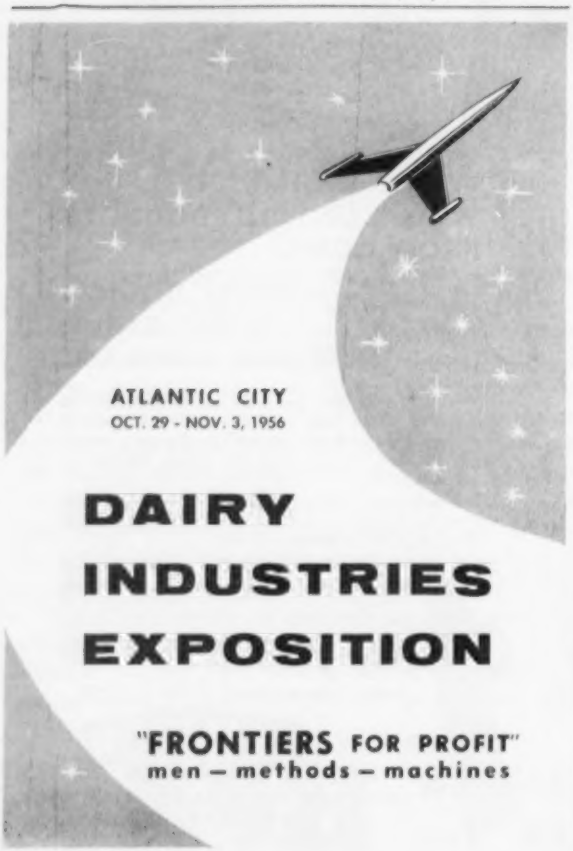
The 4 line model *accurately* fills 50 to 100 containers per minute . . . 6, 8 and 10 line models also available capable of *accurately* filling up to 250 containers per minute. Hope Type 19S Filling Machines are now in *profitable* use from coast-to-coast filling liquids, semi-liquids or viscous products in jars, plastic bottles or tin cans. For high speed, accurate filling machines look to the leader —

Write for catalog of our complete line

HOPE MACHINE COMPANY

9400-40 STATE ROAD • PHILA. 14, PA.

...n booth 413, PMMI Show, Cleveland, Sept. 11-14.



H. E. Case, head of wine operations, has been elected a V.-P. Di Giorgio Fruit Co., Los Angeles.

F. H. Catterson, has been appointed general production manager, Ac'cent International, Div. of International Minerals & Chemical Corp.

James Dillon, vice-president National Starch Products, has been elected to the board.

J. Stafford Ellithorp, Jr., previously president Beech-Nut Packaging, has been elected president of newly merged Beech-Nut Life Savers Inc.

Dave Eolkin, Gerber Products Co. has won Monsanto Award for best presented paper at IFT annual meeting.

Gen. Russwell E. Hardy and **J. Kenneth Haytt** have been elected V.-P. and general plant mgr., and v.-p. in charge of engineering, respectively, at Anheuser-Busch, Inc.

Michael D. Heeger is newly appointed products manager of Dole Hawaiian Pineapple Co.'s marketing div., San Jose, Calif.

Keith C. Johnston has been appointed general manager candy and biscuits divisions Robert A. Johnston Co., Milwaukee.

M. E. Knouse, president, Knouse Food Coop., Inc. has been elected pres. of Processed Apples Institute, Inc.

George Laimbeer, managing director, Alfred Bird & Sons, Ltd., new v.-p. and general manager Post Cereals Div., Battle Creek. Mich.

Joseph M. Collins has been elected v.-p. of Coca-Cola Co. He has been with the company for 27 yrs.

Willard H. Meinecke has been appointed general plant manager, General Mills Inc., Buffalo, N. Y.

Tom Morton has been appointed to the newly created post of general manager Holly Meat Packing Co., Oakland, Calif.

Edward J. Noble has been named chairman and chief executive officer of newly formed Beech-Nut Life Savers Inc.

L. M. Oestereich has been promoted to the post of general manager of Armour & Co.'s Columbus, Ohio, plant.

Sydney M. Rosenberg has been elected pres. New England Fish Co., Seattle, for the coming year.

Sidney C. Rowe has been promoted from v.-p. to pres. Borden's Farm Products, N. J., and chairman Borden Co.'s Middle Atlantic Fluid Milk Region.

James L. Simmons is newly elected v.-p. of Stahl-Meyer Inc., N. Y.

M. C. Somerall has been elected v.-p. Pepsi-Cola Co. of Canada Ltd.

E. S. Steinmetz is v.-p. of Consolidated Foods Corp.

R. Fullerton Stuart is assistant manager Carnation Co.'s frozen foods div.

Stanley F. Teele—Dean of the Harvard U. Graduate School of Business Administration, has been named a General Foods' director.

Richard G. Toomy has been appointed general manager American Molasses Co.

Ivan E. Welborn is superintendent of new formaldehyde and synthetic resin plant being built by the Borden Co.'s chemical div. at Fayetteville, N. C.

William J. Williams is resigning as v.-p., secretary, and director of Canada Dry Ginger Ale, Inc.

John L. Wilson has been elected executive v.-p. of Anheuser-Busch, Inc.

Associated Industries

American Can Co. will open a $1 million plant in Puerto Rico.

Anchor Hocking Glass Corp. announces promotion of James M. Fordham to factories manager container div.

Archer - Daniels - Midland announces purchase of a half interest in Applied Radiation Corp.

Atlantic Paper Co. announces appointment of William H. Kearns as assistant to pres.

B. C. Packers, Ltd. announces appointment of John M. Buchanan as board chairman, and Robert E. Walker as president.

B. T. Babbitt, Inc. has entered into an agreement to join forces with Bostwick Laboratories, Inc., and Connecticut Chemical Research Corp. in aerosol packaging field.

California Packing Corp. will start construction of a $5 million cannery at Stockton, Calif., in late fall.

Cherry-Burrell Corp. announces retirement of A. D. McKnight as manager of the Pittsburgh branch.

Clark Controller Co. established engineering and manufacturing facilities in Los Angeles.

Clark Door Co. has announced extensive expansion plans and appointment of James H. Harris Jr. as v.-p. in charge of sales.

Creamery Package Mfg. Co., Canada, Ltd. has appointed Harry Nellist as v.-p. and general manager.

Crown Cork & Seal Co. Ltd., Toronto, has elected H. G. S. Bain pres.

Dresser Mfg. Co. plans to build $1 million plant in Wellsboro, Pa.

Exact Weight Scale Co. and **Keever Starch Co.** have voted to merge into a new company to be known as National Industrial Products Co.

Hull Standard Corp. has appointed MacLean Brown as operations manager.

Hygrade Containers Ltd., Montreal, plans to start construction on a $3 million corrugated container plant in Toronto area.

Oster Manufacturing Co. announces election of Roger Tewksbury as board chairman, and appointment of T. S. Bonnema as president and general manager.

Package Machinery Co., East Longmeadow, Mass. announces appointment of Harold Mosedale, Jr. as v.-p. in charge of engineering.

Rival Packaging Co., Chicago, has appointed Joseph B. V. Getlin v.-p.

Rockwell Mfg. Co. has announced the appointment of Russell L. Sylvester as chief engineer.

Teller Co. announces appointment of Fred J. Fleischauer as chief design engineer.

Thatcher Glass Mfg. Co. announces plans to double output, and appointment of Robert N. Hodson as materials handling manager.

York Farms Ltd. will spend $10 million for the purchase and expansion of two British Columbia canning plants.

Elias D. Cohen, senior v.-p. National Starch Products, died at the age of 74. He had been with Starch for 55 years.

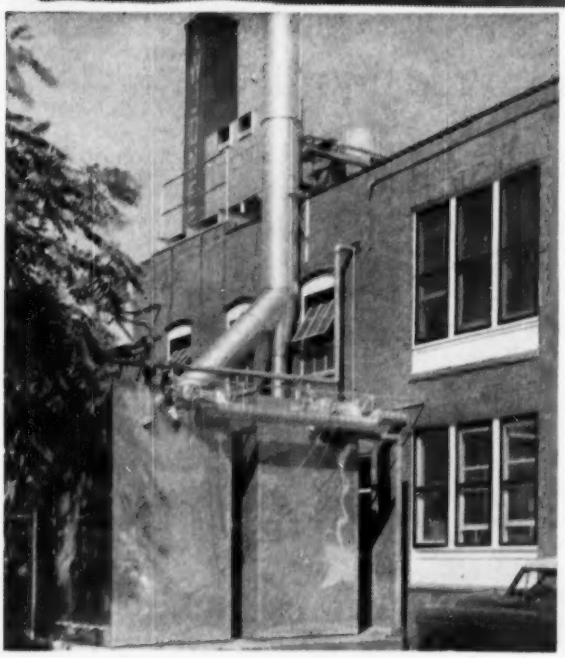
Deaths

Jessee E. Ames, 89, retired president, C. A. Baldwin & Co.

Hyman Stern, 85, honorary board chairman of Stern Can Co., Inc.

John C. Wilson, 40, bakery supervisor of Star Markets.

The "King Zeero" provides Ice Water (32°-34°) in Large Quantities at Low Cost



Tons of ice are frozen on the extra heavy coils during the "off-peak" periods, ready for your disposal without handling when needed for quick cooling of food products.

The "King Zeero" is a combination ice accumulator and continuous water cooler. With our new HI-LOAD or extra HI-LOAD Coils on vertical models, additional flash cooling capacity and faster ice making rates are obtained.

"King Zeero's" Patented Built-In Agitation obviates the necessity of a mechanical agitator. No moving parts to require servicing and expense.

Only a relatively small compressor is needed. With the "King Zeero" you have LOWER POWER DEMAND CHARGE — LOWER MAINTENANCE — LOWER OPERATING COSTS — LESS INVESTED CAPITAL.

A size for every operation — large or small — capacities 500 to 36,000 lbs. in a single unit. Write for full information.

"King Zeero" Model 2-E-612W installed outside of Jones Dairy, Buffalo, N. Y.

THE KING ZEERO COMPANY
4300-14 W. MONTROSE AVE., CHICAGO 41, ILL.

For more data, circle this page number on card at front →

Model way to ship bulk liquids

EVERY DAY the "liquid assets" of companies throughout America travel safely and surely in S.H.P.X. tank cars. Present capacity is more than 100 million gallons—and still rising!

There's good reason for this growing dependence upon Shippers' Car Line. As lessor and exclusive sales agent for ACF-built DURADOMES, we offer industry the finest tank cars that roll. They are designed for easier cleaning, maximum insulating efficiency and the best possible application of lining.

As transportation specialists, Shippers' maintains a network of offices and repair shops at strategic locations from coast-to-coast to keep rolling stock on the move... and to assure customers of prompt, dependable service.

Whether you prefer to buy or lease, you can be sure that Shippers' is prepared to meet your *special* requirements every time.

SHIPPERS' CAR LINE

DIVISION OF ACF INDUSTRIES, INCORPORATED

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CHICAGO, ILL. • HOUSTON, TEX. • SAN FRANCISCO, CAL. • MILTON, PA. • EAST ST. LOUIS, ILL. • SMACKOVER, ARK. • TULSA, OKLA. • NORTH KANSAS CITY, MO. • RED HOUSE, W. VA.

Just Off the Press

New Catalogs and Bulletins
from manufacturers of equipment and supplies
—Free For The Asking—

PLANT ENGINEERING

Selecting Couplings

Specifications for three types of flexible couplings have been condensed and listed on a wall chart for easy selection. NEMA frame numbers and shaft sizes are conveniently keyed to specs with colored boxes. 1p.—Morse Chain Co., Ithaca, N. Y. (221A)

Metal Extrusions

Gives facts on a line of tubular and solid extrusions in high-alloy, stainless steels, and non-ferrous metals. Chart lists the various metals that can be handled with this process. Bulletin TB 413, 6p.—Babcock & Wilcox Co., Beaver Falls, Pa. (221B)

Plastic Products

Details chemical, electrical, and mechanical properties of Teflon and Raylon plastics, and gives specs for various sheets, tapes, rods, and tubes fabricated from these materials. 8p.—Raybestos-Manhattan, Inc., Manheim, Pa. (221C)

Free Literature—Fast Way

Any of these very-latest catalogs, bulletins, or folders will be sped to you gratis. Just note here the specific literature you want, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service postcard — front of book. Then sign at the bottom and mail.

For your convenience, too, all items in this department are listed and keyed in the Reader Service Section.

Vari-Speed Drive

Drawings show construction of a compact speed-reduction unit with infinite control from full speed to reverse. Graphs give pertinent engineering facts. Tables present selection data. Bulletin 521, 8p.—Graham Transmissions, Inc., Menomonee Falls, Wis. (221F)

Process-Water Coolers

Treats of a galvanized, cooling-tower line with capacities from 10 to 225 tons refrig. Construction details and mechanical specs are fully covered for the centrifugal, fan-type units. Bulletin WE-1, 4p.—Mayer Refrigerating Engineers, Inc., Lincoln Park, N. J. (221G)

Plated Roller Chain

Discusses corrosion resistance, high tensile strength, and long wearing characteristics of a line of roller chain, coated with a high-chrome alloy. 4p.—Atlas Chain & Mfg. Co., West Pittston, Pa. (221H)

Precise Chlorination

Introduces two models of a new-type chlorinator that uses a V-notch variable orifice to gain precise chlorine feed control. Drawings and diagrams illustrate operating principles. Catalog File No. 25.100 and 25.110, 16p.—Wallace & Tiernan Inc., Belleville, N. J. (221I)

Variable Pulleys

Considers component parts and construction of a line of variable-speed pulley drives that apply directly to motor or machine. Horsepower ratings range from ¼ to 15 at speeds of 900 to 1800 rpm. Other facts are tabled. Catalog 60A, 18 p.—Llewellen Mfg. Co., Columbus, Ind. (221J)

How to Cut Water Hammer

Bulletin tells what water hammer is and details various methods of correcting it. Also, presents facts on a line of metal-tube shock absorbers that contain a synthetic rubber cushioning tube, capable of withstanding temperatures to 180F. Chart lists selection data. 12p.—Josam Mfg. Co., Michigan City, Ind. (221K)

Scale Model Plants

Presents available services of a company that makes three dimensional engineering and design models of industrial processes. Scale models can be obtained in varying degrees of complexity to fit a wide price range. 8p.—Atkins & Merrill, Inc., South Sudbury, Mass. (221L)

Heating Table

Depicts usefulness of a silicone-rubber-covered electric heating cable for localized application of temperatures to 275F. Input controllers and thermostats are also described. Price list included. 4p.—Edwin L. Wiegand Co., Pittsburgh. (221M)

Steam-Jet Cooler

Colorful bulletin shows theory and applications of a series of water-cooling units that operate on a steam jet principle. Table lists available sizes, ranging from 30 to 1200 tons of refrigeration. Form 9143-B, 24p.—Ingersoll-Rand Co., New York City. (221N)

Power Transmission Line

Describes flexible couplings, variable speed pulleys and transmissions, universal joints, and motor

Per pound of actual monoglyceride, no emulsifier you can get is less expensive than Myverol® Distilled Monoglycerides. And monoglycerides are what do the work.

Myverol Distilled Monoglycerides are available in bulk from most common fats and oils. For information, write *Distillation Products Industries*, Rochester 3, N. Y. Sales offices: New York, Chicago, and Memphis • W. M. Gillies and Company, Los Angeles, Portland, and San Francisco • Charles Albert Smith Limited, Montreal and Toronto.

distillers of monoglycerides made from natural fats and oils

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Also . . . vitamin A in bulk for foods and pharmaceuticals

Distillation Products Industries
is a division of **Eastman Kodak Company**

Put yourself in his shoes

Matter of fact, that's not a bad place to be. For when you stand beside a Cherry-Burrell "Kold Vat" you're in a position to do so *many* things . . . to so *many* products . . with one stainless steel rectangular vat.

For example, you can use the heavily insulated "Kold Vat" for space-saving storage of raw or finished products . . . as a surge vat or for complete mixing without whipping or beating.

And with a "Kold Vat" you can quickly heat or cool almost any liquid or semiliquid product. Cherry-Burrell's exclusive enclosed channel wall surface assures rapid, effective heat transfer . . . with steam, hot water, cold water, "Freon," ammonia or some other refrigerant.

"Kold Vat's" square shape not only helps you pack *more* product into *less* space, but also leads to low rail height for easy dumping, observation and cleaning.

Your Cherry-Burrell Representative can give you complete dimension data on every tank from 150 to 1000 gallons. Call him or write for bulletin.

CHERRY-BURRELL
CORPORATION

427 W. Randolph Street, Chicago 6, Ill.

Dairy • Food • Farm • Beverage • Brewing • Chemical • Equipment and Supplies

SALES AND SERVICE IN 58 CITIES — U.S. AND CANADA

bases. Table give selection data, and information includes operation, horsepower ratings, sizes, and types of all units. 12p.—Lovejoy Flexible Coupling Co., Chicago. (221O)

Cooling Towers

Covers operating information and design of a series of heavy-duty steel cooling towers, available in 23 sizes from 10 to 400 tons. Charts, graphs, and diagrams illustrate selection data. Bulletin 202, 12p.—Baltimore Aircoil Co., Inc., Baltimore. (222A)

Condenser Tubes

Concerns factual material on a line of welded tubes for heat-exchanger and condenser applications. Chart lists hydrostatic test pressures for various sizes. Round, square, rectangular and special shapes are described. Bulletin TB-412, 6p.—Babcock and Wilcox Co., Beaver Falls, Pa. (222B)

Blow-off Valves

Considers a line of single and tandem blow-off valves for high pressure service to 2,500 psi. Units are available in hard-seat, seatless models, and combinations of the two. Selection information is detailed. Bulletin B-434, 24p.—*Yarnall-Waring Co., Philadelphia. (222C)*

Spray Nozzles

Gives full information on wide line of industrial spray nozzles. Pictures show non-clog, gas scrubbing, flat spray, and other models. Assessories, such as strainers and regulators, are also depicted. Catalog 1, 20p.—*Monarch Mfg. Works, Inc., Philadelphia. (222D)*

Steel Floor Armor

Specifies how to install an expanded-steel grating in cement floors to increase their wear-resistance. Tips show application in new concrete, over existing concrete base, and on wooden floors. —*Klemp Metal Grating Corp., Chicago. (222E)*

Pilot-Operated Valves

Concerns construction, operation, and selection of a series of pilot-operated control valves for heavy-duty service on air, hydraulic oil, water, and vacuum lines. Bulletin SK 356, 6p.—*Valvair Corp., Akron, Ohio. (222F)*

Cooling Controls

Self-contained cooling control valves have built-in temperature and by-pass adjustment, according to diagrams in this new bulletin. Units eliminate over-cooling and step-up efficiency of compressors, stills, condensers, bearings, and other machines. Bulletin 710-B, 2p.—Sarco Co., Inc., New York City (222G)

Water Softeners

Concerns efficiency of industrial-sized, automatic water softening units. Describes operating principles, construction, and applications with text and drawings. Chart lists capacities. Bulletin 105, 8p.—L. A. Water Softener Co., Glendale, Calif. (222H)

Industrial Heaters

Illustrates and specifies a wide range of industrial heating devices. Units range from strip, immersion, and forced-convection heaters to specially-shaped, cartridge, and finned components. Catalog 27-620, 30p.—Westinghouse Electric Corp., Pittsburgh. (222I)

Multi-Tube Dust Collector

Comprises line-drawings, cutaways, and nomographs that give all pertinent facts on design and selection of a multi-tube centrifugal dust collector. Bulletin 100, 12p.—Research-Cottrell, Inc., Bound Brook, N. J. (222J)

Laminated Tubing

Specifies characteristics of laminated glass fiber and plastic tubing, available in a wide range of shapes and sizes. 4p.—Lamtex Industries, Inc., Westbury, L. I., N. Y. (222K)

In-line Mixing

Discusses general theory of mixing as it relates to a continuous, in-line mixing device. Unit's capacities, design data, and features also presented. Technical Supplements HM-5, 7, 9, and 13, 10p.—American Well Works, Aurora, Ill. (222L)

Boiler-Water Deaerator

Details construction and operation of a vertical deacrator, designed to eliminate tubular vent condensers without impairing efficiency. Line drawings and cutaway illustrate features. Publication 4651, 4p.—Cochrane Corp., Philadelphia. (222M)

Air-Cooled Condensers

Data sheet presents engineering facts on air-cooled condensers for refrigeration and air conditioning systems. Units handle from 2 to 10 tons refrig. and are self-contained for remote operation. 2p.—National-U. S. Radiator Corp., Draver-Hanson Div., Los Angeles. (222N)

Liquid-Gas Heat Exchanger

Contains concrete facts on operation and efficiency of a water-and-air-cooled heat exchanger for process liquids and gases. Installation photos and a working diagram show features. Bulletin 132, 4p.—Niagara Blower Co., New York City. (222O)

Solenoid Valves

Fact sheet briefs data on new bronze and stainless steel solenoid valves. Table gives specs and prices. Sizes ¼ to 1 in. 1p.—J. D. Gould Co., Indianapolis. (222P)

Brass Needle Valves

Describes flow control of water, air, oil, and other fluids, at pressures up to 400 psi., with a

small, brass needle valve. Units are made in sizes from ¼ to ½ in. Bulletin 3,000, 1p.—Generant Engineering Co., Newark, N. J. (222Q)

Reciprocating Pumps

Concerns sizes, capacities, and construction of a series of single and duplex, horizontal, reciprocating pumps. Cylinders are made from forged steel. Circular 146A, 6p.—Dean Bros. Pumps Inc., Indianapolis. (223A)

Alloy-Steel Tubing

Technical information on twelve types of alloy steel tubing includes data on carburizing and thermal treatments, mechanical properties, critical points, and suggestions for welding and machining. Folder TDC-184, 4p.—Babcock & Wilcox Co., Beaver Falls, Pa. (223B)

V-Belt Sheaves

Comprehensive bulletin tables full facts on selection of sheaves for multiple V-belt drives. Ordering of custom-made units is specified, too. Catalog MVD-56, 18p.—Maurey Mfg. Co., Chicago. (223C)

Surface-Type Heaters

Cutaway drawing shows features of a surface-type, hot water deaerating heater for boiler feed water. Chart lists available capacities (from 1,200 to 12,000 gph.). Publication 4654, 4p.—Cochrane Corp., Philadelphia, (223D)

Dihedral Couplings

Presents working data on a series of standard, floating shaft, and mill-motor-type dihedral couplings. Units are designed to handle angular and off-set misalignments up to 12 deg. Catalog 62, 8p.—Ajax Flexible Coupling Co., Westfield, N. Y. (223E)

How to Install Plastic Pipe

Pictures method for threading, bending, and installing plastic piping, fittings, and valves. Also describes applications and physical properties of the plastic material. 8p.—B. F. Goodrich Co., Marietta, Ohio. (223F)

MAINTENANCE

Hydraulic Hose Selector

Handy pocket "slide rule" permits fast selection of properly-sized hydraulic hose from any single known factor, such as ID, OD, or required working pressure.—Lee Rubber & Tire Corp., Youngstown, Ohio. (223G)

Special Fasteners

Describes and pictures wide line of screws, bolts, nuts, and threaded inserts that contain pellets of Nylon, to insure a tight lock. Charts speed selection of available sizes. Catalog 11B, 12p.—Nylok Corp., Elmira Heights, N. Y. (223H)

Hydraulic Oils

Company publication contains technical discussion on selection of hydraulic oils. Article has graphs showing effects of temperature and pressure on viscosity, and other pertinent facts. *Lubrication*, July '56, 11p.—Texas Co., New York City. (223I)

Kits for Plastics Work

Specifies two tool kits that aid in industrial applications of plastics. One enables welding of plastics. The other, speeds spraying of protective coatings on metal equipment. 2p.—American Agile Corp., Maple Heights, Ohio. (223J)

Leak-Proof Rivets

Gives technical facts and testing data on aluminum-jacketed rivets, developed for the airplane industry, that are said to give fluid-tight closures. 6p.—Pastushin Industries, Inc., Los Angeles. (223K)

Water Treatment

Folder tells how to cut costs in treating air-conditioning water supplies by using a compound that cuts formation of scale, slime, and algae. 4p.—Oakite Products, Inc., New York City. (223L)

Silver Brazing Alloys

Treats of a method for braze-joining metals with low temperature silver alloys. Pictures show many examples, charts list details. Bulletin 20, 24p.—Handy & Harman, New York City. (223M)

MATERIAL HANDLING

Portable Belt Conveyors

Pictures line of powered belt conveyors that double as elevators. Portable units are available in 5- to 20-ft. lengths with belts of 8-,12,- and 16-in. width. 6p.—Arrow Products, Inc., Grand Haven, Mich. (223N)

Industrial Truck Line

Extensive catalog portrays a full line of fork lift trucks, platform lift trucks, industrial tractors, and trailers. Both gasoline and electric models are covered. Catalog 400, 52p.—Mercury Mfg. Co., Chicago. (223O)

Electric Platform Truck

Specifies features of a 4,000-lb., electric platform truck. Handle-mounted control gives three forward and reverse speeds. Bulletin 1003-W, 4p.—Automatic Transportation Co., Chicago. (223P)

Full Lift Truck Line

Concerns a wide line of pneumatic and solid tire lift trucks with capacities from 1,000 to 7,000 lb. Also pictures an industrial crane and numerous special lift truck attachments that give added flexibility. 12p.—Hyster Co., Portland, Ore. (223Q)

THE SPRAY NOZZLES
You Need
You'll find the nozzle to meet your specific requirements in the complete selection offered by Delavan . . . one of the world's leading producers of high quality precision nozzles.
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with PREST-O-MATIC® ELECTRIC COLD STORAGE DOORS
Open-through-close door cycle is completed in 8-10 seconds automatically. Users report expensive man-truck-hours fully utilized at top efficiency — more goods handled in less time. "Open-door-time" is reduced 75%, resulting in substantial refrigeration savings.
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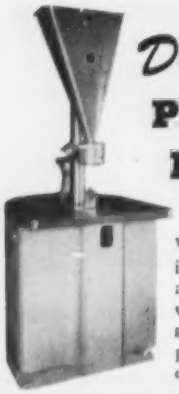

Dustless
POWDER FILLING

Vacuflow powder filling equipment operates on a principle of vacuum feeding, instead of pressure, to pack powder into a container.

VACUFLOW

Air is removed from the container to create a vacuum which draws a measured quantity of powder from the hopper. There is no problem with dust control, since the unique Vacuflow method simply does not involve air currents that cause dust.

Semi-automatic models are available for filling containers ranging from the tiny talcum box up to and including 100 lb. paper bags and 200 lb. drums. Rotary models are available for automatic production of 5 lb. sizes or less at speeds of 45 to 300 per minute.

Pneumatic is the one manufacturer in a position to furnish machines for making up complete production lines. Units are available for air cleaning, powder and liquid filling, capping and labeling a wide range of bottles, cans or jars.

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PNEUMATIC

Motorized Cart

Covers features of unique, motorized, tricycle-type cart for general hauling. 4p. — Linden Equipment Corp., Los Angeles. (224A)

Monorail Crane

Covers principal components and various carriers for an overhead, monorail crane. Track design and formulas and figures for comparing various track sections are also detailed. Booklet 2008M, 12p.—Cleveland Crane & Engineering Co., Wickliffe, Ohio. (224B)

Table Conveyor

Leaflet has information about a table-type conveyor with side panels to increase working room. It can be fitted for one or two-way operation. Form 1000-56, 2p.—Rapids-Standard Co., Inc., Grand Rapids, Mich. (224C)

Lift Truck Series

Details lifting mechanism, engine, transmission, and all other components of a series of fork lift trucks. Colorful photos illustrate parts and features. The new units handle from 7,000 to 11,000 lb. 32p.—Towmotor Corp., Cleveland. (224D)

Carton Stacker

Shows a machine for making interlocking loads of cases without using pallets. The unit blocks are handled by lift trucks equipped with grab arms. 2p.—Standard Conveyor Co., North St. Paul, Minn. (224E)

Telescopic Conveyor

Considers loading and carrying advantages of a three-section, telescopic, skate-track conveyor. Unit has curves and mobile loading dock to round out accessories. Catalog 102, 24p.—Wilkie Co., Philadelphia. (224F)

Special Carriers

Photos illustrate many kinds of standard and special conveyors for a wide range of applications. Units include trolley, belt, roller, and chain carriers. Catalog 400, 20p.—E. W. Buschman Co., Inc., Cincinnati. (224G)

Vertical Conveyor

Concerns operation of an automatic elevator that whisks palletized goods between floors. Compact unit installs vertically to save floor space. Bulletin ALV-130, 4p.—Alvey Conveyor Mfg. Co., St. Louis (224H)

Bucket Elevator

Fact sheets diagram and specify a bucket conveyor, screw, and vibrator combination for handling abrasive materials. 8p.—Prab Conveyors, Inc., Roseville, Mich. (224I)

Carton Stacking, Loading

Pocket booklet gives factual descriptions of the proper way to stack and load corrugated shipping boxes. Booklet 2, 14p.—Hinde & Dauch, Sandusky, Ohio. (224J)

Adjustable Loading Docks

Considers two methods for adjusting dock-truck height for easy loading. One employs hydraulic platform to raise and lower truck. The other, mounts in dock and adjusts to truck bed. 4p.—Rowe Methods, Inc., Cleveland. (224K)

Adjustable Elevator

Leaflet shows operation of hydraulic-controlled portable elevator with powered belt. Unit can be collapsed for compact storage. 2p.—Speedways Conveyors, Inc., Buffalo (224L)

QUALITY CONTROL

Infrared Spectroscopy

Features charts and pictures that detail wide uses of infrared spectroscopy, and discusses company's newest double-beam, monochromator unit. Additional facts on data processing. Bulletin 18, 8p.—Beckman Instruments Inc., Fullerton, Calif. (224M)

Rat Bait Station

Pictures compact poison and water station for rat control. Unit is steel construction and has a lip-fed hopper to avoid waste. 1p.—Solvit Chemical Co., Madison, Wis. (224N)

Filter Paper

Lists full line of filter papers and suggest grades commonly used in testing a wide range of products. 4p.—Mathias Paper Corp., Philadelphia. (224O)

Photographic Processor

Publishes advantages for using a compact photo processor to uniformly develop, fix, wash, and dry both plates and films used in lab analyses. Entire operation is said to take only 3½ min. Catalog P6-56, 4p.—Jarrett-Ash Co., Newtonville, Mass. (224P)

Laboratory Instruments

Presents line of standard and special lab instruments such as an automatic pipette, rubber tubing pump, utility water bath, hotplates, scales, electronic pH meter, and a rotating vacuum evaporator. 16p.—Schaar & Co., Chicago. (224Q)

Precision Balance

Covers features of a streamlined balance for accurate analytical work. Unit has circular doors, dial for built-in weights, and swivel-type weight compartment in base. 4p.—C. A. Brinkman & Co., Great Neck, L. I., N. Y. (224R)

Freeze-Drying Equipment

Discusses and pictures latest units for freeze-drying on lab scale. Detailed are vacuum gages, pumps, bath coolers, refrigerated

Coatings of ALATHON® polyethylene resin provide superior protection for packaged foods

The secret of fine Italian spaghetti is in the sauce. The Pompeian Olive Oil Corporation was looking for a means to market an outstanding sauce. A package was needed that could lock in the flavor of dehydrated spices and herbs until the housewife had a chance to combine them with tomato paste and five minutes later serve up a delicious dinner.

A package coated on the inside with Du Pont ALATHON polyethylene resin solved the problem. The Dobeckmun Company, manufacturers of this pouch pack, chose ALATHON for its outstanding properties for food-packaging applications.

Because it is odorless and non-toxic, ALATHON preserves the vital flavor of the spaghetti-sauce mix. And its resistance to the chemical action of salt and other spices gives adequate protection to the aluminum foil. ALATHON has a range of flexibility at heat-sealing temperatures and excellent working properties in drawing or forming.

Perhaps the many advantages of ALATHON — specially developed as a coating resin by Du Pont — can help you solve your packaging problems. We'll be glad to send you more information. Just clip and mail the coupon below.

There is a difference in polyethylene resins — specify **ALATHON®** *for your packaging needs*

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Soybean Dust Problems Solved by Sturtevant Air Separator

RIGHT: Spencer Kellogg & Sons employee making classification adjustment on Sturtevant Air Separator in operation at Bellevue, Ohio, soybean meal plant. Separator minimizes air-borne dust losses while removing hulls and classifying end product.

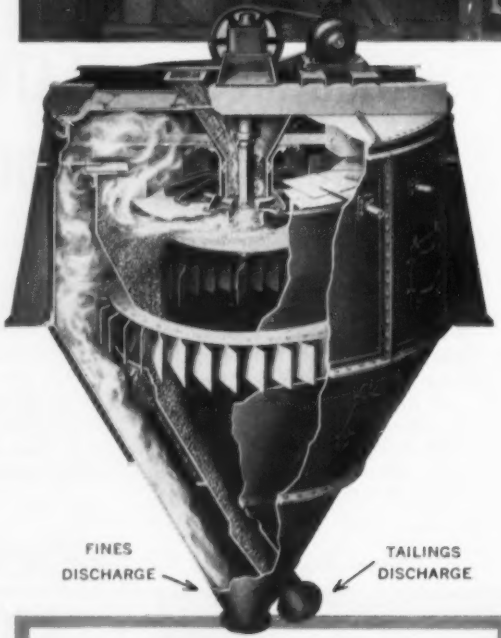
LEFT: Two lead-off chutes at bottom of Sturtevant Air Separator in Spencer Kellogg & Sons plant. One chute in the closed circuit system sends to packaging all uniform size, dust-free meal while the other returns all undersize fines for pelletizing.

Closed Circuit Air Separation Cuts Losses, Keeps Plant Cleaner, Improves End Product

Dust — finer than 80 mesh — was accounting for 4 to 5 percent of the soybean meal production at the Spencer Kellogg & Sons plant in Bellevue, Ohio. Much of this dust was disseminated into the air during processing, becoming a total loss. And such free dust made working conditions unpleasant, plant and storage sheds untidy in appearance. Also, the proportion of dust retained in the end product was an annoyance to farmers and ranchers.

All of these problems have been solved by a Sturtevant Air Separator operating in closed circuit with a pelletizing machine. The processed soybean meal goes through the Air Separator at the rate of about 85 tph. Particles representing dust and hulls go out the fines chute to the pelletizer. The pellets are then ground and re-circulated through the Air Separator at rates to 10 tph, bringing the machine's total capacity to 95 tph.

The net result is that Spencer Kellogg & Sons now has cut dust loss to a minimum, no longer has any air-borne dust problems, and is producing a better standardized, dust-free end product. Sturtevant, the pioneer in centrifugal air separation, has once again helped to solve a precision classification problem — *and without an expensive, multi-unit installation.* Write today for more information. Address: Sturtevant Mill Co., 106 Clayton St., Boston 22, Mass.



THERE'S A STURTEVANT FOR EVERY CAPACITY

No other single air separator can match Sturtevant's 40 to 400 mesh classification range at rates up to 100 tph. . . . and tested record of increasing mill capacities from 25 to 300% while lowering power consumption as much as 50% (when used in closed circuit with grinding mills). Nine models available, ranging from 3 to 18 ft. in diameter. Request Bulletin No. 087.

STURTEVANT

Dry Processing Equipment

The "OPEN-DOOR" to *lower* operating costs over *more* years

CRUSHERS • GRINDERS • MICRON-GRINDERS • SEPARATORS
BLENDERS • GRANULATORS • CONVEYORS • ELEVATORS

centrifuges, and others. 36p.—Arthur S. LaPine & Co., Chicago. (224S)

Nutrition Research

Reviews past research work on nutrition in pediatric allergies. Extensive reference list cited. 19p.—Borden Co., New York City. (227A)

New-Model Microscopes

Introduces three new microscopes with full-rotating, interchangeable bodies. Models are monocular, binocular, and trinocular. Latter is designed for photomicrography. 24p.—American Optical Co., Buffalo. (227B)

Filter Applications

Gives description of a membrane filter and details methods for its use as a microbiological tool. Various microchemical and microphysical applications are also noted. 43p.—Millipore Filter Corp., Watertown, Mass. (227C)

Moisture Tester

Treats of various features for a compact apparatus used to accurately determine moisture contents of products from a low of 0.0005% up to 100%. Data Sheet 11259B, 4p.—Precision Scientific Co., Chicago. (227D)

Bacteriological Media

Comprehensive manual details very-wide line of culture media, materials, and apparatus for the microbiological laboratory. Various handy conversion tables are included, with a complete index. 240p.—Baltimore Biological Laboratory, Inc., Baltimore. (227E)

Portable Viscometer

Gives full facts on advantages of a compact, portable viscometer. To operate, instrument is merely inserted in liquid, motor is switched on, and viscosity read directly from a scale. 8p.—Brookfield Engineering Laboratories, Stoughton, Mass. (227F)

Starch Granule Microscopy

Tells of research work in the use of phase microscopy for examining starch granules. Photos illustrate points. 6p.—Mellon Institute, Pittsburgh. (227G)

PACKAGING

Pressure-Tape Protection

Describes use of a pressure-sensitive plastic tape to eliminate sticking and scratching in packaging machines. 2p.—Connecticut Hard Rubber Co., New Haven. (227H)

New Code-Dater

Shows operation of a compact new device for code dating packages. Illustrates simple method of changing type. 2p.—Acro Tool & Die Works, Chicago. (227I)

Portable Bag Closer

Treats of a light-weight, portable bag closer, said to sew an average 100-lb. paper or cloth bag in less than 6 sec. 4p.—Dave Fischbein Co., Minneapolis. (227J)

Carton and Formers

Leaflet shows a locking-type carton and three formers used to set it up. Pictured are a hand former, semi-automatic unit, and completely automatic model for large-scale operations. 1p.—St. Regis Paper Co., Cleveland. (227K)

Marking Devices

Briefly describes and pictures a 10-model line of case, can, and bottle marking and coding devices. Also covers imprinters for roll film. 4p.—Adolph Gottscho, Inc., Hillside, N. J. (227L)

Automatic Bag Maker

Comprises illustrations and details covering a high speed machine that forms bags from roll stock. One unit can produce up to 25,000 bags per shift. 4 p.—Food Machinery & Chemical Corp., Simplex Packaging Machinery Div., Oakland. (227M)

INSTRUMENTS

Sanitary Flowmeter

Concerns operational advantages of a hermetically-sealed, sanitary flowmeter that accurately measures and totalizes rate of flow in liquids and slurries by measuring rate of heat transfer from product. Panel instruments can be located at a remote distance from source. 4p.—Industrial Development Laboratories, Inc., Jersey City, N. J. (227N)

Force Control Switch

Refers to a 9-model line of control switches that operate other mechanisms when mechanical forces are applied to them. Unit capacities cover a wide range to accommodate light and heavy loads. 3p.—W. C. Dillon & Co., Inc., Van Nuys, Calif. (227O)

Tank Gage and Valve

Shows combined instruments: A petrometer for gaging tank contents, and a safety cleanout valve for quick removal of water and sludge from storage vessels. The combined devices are operable at remote locations. 6 p.—Petrometer Corp., Long Island City, N. Y. (227P)

Sound Analyzer

Treats of operation and construction of a device for direct measurement and analysis of noise. Instrument is portable and enables safety engineers to spot

Ideal for Dairy and Food Industries

The Strahman Spray Nozzle does a better job with the least amount of water. This precision made nozzle enables the operator to get any type stream of water to do his job by simply pressing the lever. A soft spray is sent forth with slight pressure on the lever, and a strong straight stream may be had by pushing the lever all the way down. This convenient control of the wash water assures better cleaning with a lot less effort. The nozzle automatically shuts off the moment the lever is released, thereby eliminating all waste of water.

RENEWABLE RUBBER COVER. The sturdy cover protects the nozzle and your equipment against knocks and dents. When the cover becomes worn, replace it with a new one.

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Spices
More
POPULAR!
Statistics now prove Americans are more seasoning conscious than *ever before* in history.
All the more reason *to be sure* you're using high quality, NATURAL SPICES in all your products.
American Spice Trade Association
82 WALL STREET, NEW YORK 5, N. Y.

troublesome sound conditions. Bulletin 0818-1, 4 p.—Mine Safety Appliances Co., Pittsburgh. (227Q)

Gas Pressure Switch

Gives features of a safety cutoff switch for multiple burner, gas installations. Device may also be used to control other hazardous gases. Diagrams illustrate installations and instrument construction. Spec. Sheet S 1011-1, 2 p.—Minneapolis-Honeywell Regulator Co., Philadelphia. (228A)

Liquid Batching

Specifies operation of an automatic meter used in batching light and heavy liquids. Photos show actual installations. Diagrams illustrate action of this robot device. Bulletin FL-56, 12 p. Hetherington & Berner Inc., Indianapolis. (228B)

Turbidity Measurement

Informs on a continuous-flow colorimeter developed to test turbidity in beer. Unit hooks to a continuous recorder for permanent quality control records. 2p.—Bristol Co., Waterbury, Conn. (228C)

Control Panels

Pictures several examples of attractive, modern control panels that are built to customers specs for special operations. 6p.—Minneapolis-Honeywell Regulator Co., Philadelphia. (228D)

Armored Thermocouples

Comprises selection facts for a series of thermocouples that are plated with stainless steel for greater protection. Charts give pertinent data. 14p.—Thermo Electric Co., Inc., Saddle Brook, N. J. (228E)

PROCESSING

Evaporators, Filters

Briefly discusses such operations as evaporation, crystallization, filtration, and spray drying, and equipment for performing these tasks. Many photos show typical installations. 12p. — Swenson Evaporator Co., Harvey, Ill. (228F)

Heavy-Duty Separators

Reports features of a series of heavy-duty liquid separators that have centripetal pumps for pressure discharge of the water phase. Cutaway view shows general design details. Bulletin 2126, 4p.—Centrico, Inc., Englewood, N. J. (228G)

Gyratory Screen

Covers design, applications, and operation of a gyratory screen separator for solids. Available with 3 to 7 decks, and from 2 to 4 outlets. Bulletin 07B8446, 12p.—Allis-Chalmers Mfg. Co., Milwaukee. (228H)

Vacuum Pasteurizer

Concerns a high vacuum pasteurizer that is said to restore fresh flavor to off-flavored milk. Unit comprises two vacuum chambers and a pasteurizing section. Diagram shows hook-up. 8p.—De Laval Separator Co., Poughkeepsie, N. Y. (228I)

Blenders, Heaters

Presents a line of mixers and heat exchangers in a wide range of sizes and capacities. Charts give selection data, photos and drawings illustrate equipment. Bulletin 14, 16p.—Patterson-Kelley Co., Inc., East Stroudsburg, Pa. (228J)

Frozen-Meat Grinder

Specifies an extra-large hopper throat, a bevel-edged screw, and special bearings that equip a standard grinder to handle frozen meats. Close-up photos show features. 2p.—Specialty Manufacturers, Schiller Park, Ill. (228K)

Baking Pan Line

Shows a complete line of stock, baking pans with complete specifications for selection. Also, covers anti-burn coating and protective, embossed bottoms. 20p.—Chicago Metallic Mfg. Co., Chicago. (228L)

PERSONNEL

Freezer Clothing

Shows complete line of freezer clothing ranging from hoods and parkas to completely insulated suits, gloves, and boots. 4p.—RefrigiWear Cloth Co., New York City. (228M)

Insulated Clothing

Pictures wide line of insulated clothing that increases employee comfort under low temperature conditions. 4p.—*Freezer Clothing Sales Co., Silver Spring, Md.* (228N)

PRODUCTS

Foreign Fish Industry

Multi-picture bulletin tells story of the Icelandic fishing industry and production of high quality sea foods. Products are imported to this country. 6p.—Coldwater Sea Food Corp., N. Y. C. (228O)

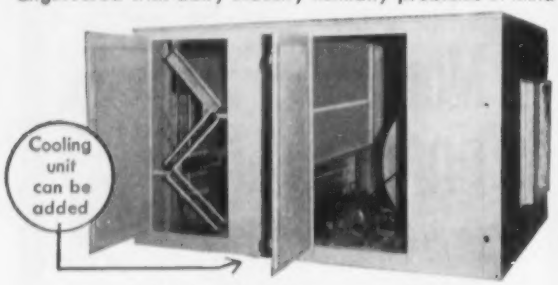
Brewed Coffee Acids

Research paper details investigation of organic acids in brewed coffee, and their effect on brewed coffee flavor. Publication 12, 10p.—Coffee Brewing Institute, New York City (228P)

The new
KLIMATIC KING

a compact heating, ventilating unit

Engineered with dairy industry humidity problems in mind



Designed for dairy, ice cream and food processing plants, the Klimatic King is fabricated with a corrosion-resistant galvanized steel casing, insulated to eliminate condensation and dripping. Automatic controls for temperature and ventilation. Two speed motor for "high" and "low" production periods, provides maximum economy of operation. These and many other features are standard with the Klimatic King, not "optional extras". The quality leader in its field. Sizes 3,500 to 20,000 CFM.

Write for detailed technical bulletin. More than fifty years experience is at your disposal. Write today

THE King CO. OF OWATONNA

905 NORTH CEDAR ST. OWATONNA, MINNESOTA

MANUFACTURERS OF SHARP FREEZE, COOLING, VENTILATING AND HEATING SYSTEMS

Freeze-Grab Peeling and Separating

—*Continued from page 45*

sprayed with a fine mist, then put through the cold rolls.

And even hides have been de-haired by passing them over a refrigerated roll.

Still another area of application for selective freezing is in seafood preparation.

Strips Shrimp Veins, Fish Scales

The objectionable back-vein in shrimp can be removed with a drum-type unit, after they are cooked. With similar conditioning, fish are scaled and skinned on the same equipment.

If intermittent action is desired for any particular operation, it may be attained by simply inserting non-conducting panels in the drums.

However, while refrigerated rolls are perfect for many operations, other shapes greatly extend the operating range of this technique.

A flat, portable unit can be constructed for large, irregular objects. And finally, it tomato catsup or sauces are flowed over an inspection chute in a thin film, a pointed, refrigerated, probe surface can be used to weed out defective specks.

The latter device is also useful in extracting hard-to-get meat from crab and lobster shells. Many other tasks can undoubtedly be solved with this versatile technique.

Above article based on paper presented by author at annual meeting of Institute of Food Technologists, St. Louis, 1956.

End (Resume reading on page 46)

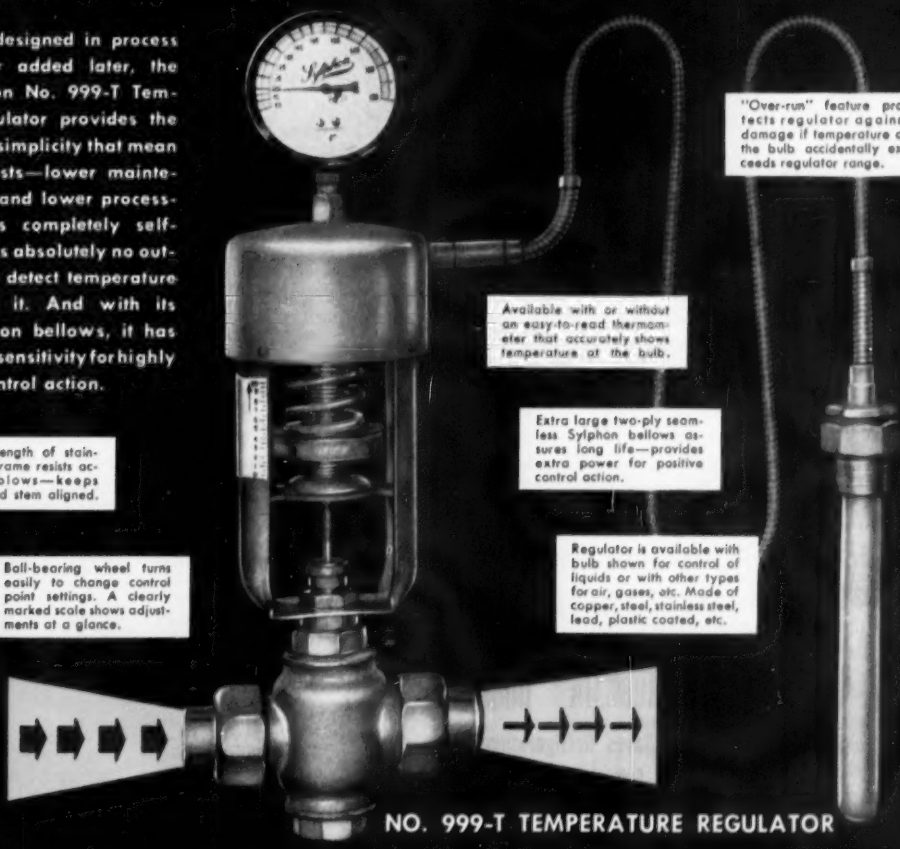
FULTON SYLPHON TEMPERATURE REGULATOR HEADQUARTERS, U.S.A.

CONTROLS TEMPERATURE

UNDER ITS OWN POWER

COMPLETE LINE OF REGULATORS, VALVES, MIXERS, AND CONTROLS FOR LIQUIDS, AIR OR GASES.

Whether it's designed in process equipment or added later, the Fulton Sylphon No. 999-T Temperature Regulator provides the accuracy and simplicity that mean lower first costs—lower maintenance costs—and lower processing costs. It's completely self-contained, uses absolutely no outside power to detect temperature or to control it. And with its famous Sylphon bellows, it has the power and sensitivity for highly responsive control action.



"Over-run" feature protects regulator against damage if temperature at the bulb accidentally exceeds regulator range.

Available with or without an easy-to-read thermometer that accurately shows temperature at the bulb.

Extra large two-ply seamless Sylphon bellows assures long life—provides extra power for positive control action.

Added strength of stainless steel frame resists accidental blows—keeps bellows and stem aligned.

Ball-bearing wheel turns easily to change control point settings. A clearly marked scale shows adjustments at a glance.

Regulator is available with bulb shown for control of liquids or with other types for air, gases, etc. Made of copper, steel, stainless steel, lead, plastic coated, etc.

NO. 999-T TEMPERATURE REGULATOR

Available with 60° F ranges between 20° and 455° F.
Variety of valve types in sizes from ⅛" to 4".

Mr. Controls

Robertshaw-Fulton CONTROLS COMPANY

FULTON SYLPHON DIVISION
Knoxville 1, Tenn.

Robertshaw-Fulton Controls Co.
FULTON SYLPHON DIVISION
Knoxville 1, Tenn.

☐ Send literature on Temperature Regulators for Industrial Processes, Catalog D-RG

Name_____

Company_____

Address_____

City_____ State_____

Pasteurizing Prescription

—*Continued from page 77*

tion levels were determined with brewery operations under constant control.

Thus, we could estimate the probable safety factor in the pasteurization process commonly employed.

The data indicated that, under abnormal conditions, customary schedules have a safety factor of about 3. But given careful quality control, this factor can range to 30.

It must be emphasized, however, that such data do not blanketly apply to all beers and all breweries. Actual lethel-heat requirements for a specific process can be established only by a testing program.

In our work, we expressed the effectiveness of a pasteurizing process in terms of equivalent time at 140F., and called 1 min. at this temperature 1 Pasteurization Unit (P.U.).

Thermal-death time curves for the various organisms showed that an abnormal yeast had the highest thermal resistance: 5.6 P.U. The slope of the curve (z) was found to be 12.5F. Then we drew the time-temperature curve for the pasteurization process, and converted each temperature to its corresponding lethal rate (Table I).

Finally, a plot of time-vs.-lethal rate was made (graph) to measure the area under the curve. The area figure is converted to Pasteurization Units when divided by the area of 1 P.U. And this value, compared to the resistance of the organism (6.5 P.U.), indicates the efficiency of the process.

Our data further revealed that a process such as 15 min. at 140F., which provides some 20 P.U., could safely be reduced. But the reduction depends on operating conditions in the individual brewery.

To control the heating of containers during pasteurization, we installed valves on 16 of the 26 headers in the second preheat compartments.

For any given package unit, P.U.'s picked up in the pasteurizer section are fixed, since heat input is constant. Therefore, any adjustment to the desired number of P.U.'s is made in the second preheat compartment. Here, the quantity of water delivered is controlled by turning valves on or off. And the time at which initial heat is applied can be varied by closing valves on headers at the beginning of the compartment.

Typical operating schedules for various sized packages are in Table II.

Valves were also placed on six of the ten headers in the final cooling sections. These serve to cut down on the use of cooling water when it is available at lower temperatures, as in the winter. They also control final package temperature to prevent humid-weather condensation on the container, which interferes with labeling.

End (Resume reading on page 78)

2-Compartment Trailer

—*Continued from page 90*

rier compressor driven by a four-cylinder gasoline engine set in a housing beneath the center of the trailer. The same engine drives a generator. The entire system is of the automatic defrost type, its oversize fans powered by this generator.

The crank-operated movable bulkhead consists of an aluminum frame covered with sheet aluminum and insulated with 6 in. of glass fiber. It can be moved forward or backward 10 ft. to change the space relationship from 60-40 to 80-20, depending on the load. Clamps lock it in place.

Since the Transicold units offer a 0-40 deg. temperature range, one section may be kept at 0 deg. for frozen foods, and the other at a higher reading for other products.

Insulation for the body is 6 in. of glass fiber in side and ends, and 6 in. of Styrofoam in floor and ceiling.

End (Resume reading on page 92)

REDUCE "OPEN-DOOR-TIME"!

COLD STAYS IN—HEAT STAYS OUT

INSTALL

RUBBAIR® DOOR

- Saves Refrigeration
- Fully Automatic
- Speeds Material Handling
- Protects Loads, Equipment, Personnel
- Maintains Temperatures

RUBBAIR® DOORS are simple and easy to operate, ruggedly built for toughest usage. Built to meet user's specifications. Made of heavy-duty durable natural rubber casing, neoprene coated core material and reinforced with H-section rubber extrusions.

RUBBAIR® DOORS are installed in:

- PLANTS
- WAREHOUSES
- FACTORIES
- INSTITUTIONS
- SUPERMARKETS
- MILLS
- HOSPITALS
- RESTAURANTS
- POST OFFICES

RUBBAIR® DOORS are available in 20 different colors. Also available for chutes, conveyors and ducts.

For complete information write:

Stic-Klip® MANUFACTURING CO., INC.
RUBBAIR® DOOR DIVISION
80 Regent St., Cambridge 40, Mass.

What's a '12-Issue' Encyclopedia?

Why, twelve issues of FOOD ENGINEERING, of course! And now you can have your own "encyclopedia" by keeping *your* copies in a handy Jesse Jones Volume File. Annual Index in December issue.

The files are compact, smart looking, come in rich red-and-green covers of elephant-hide toughness. Washable, permanently attractive, they include gold lettering of 16 carat.

Best yet, they're reasonably priced! Only $2.50 each, 3 for $7.00, 6 for $13.00; shipped postpaid. If ordering outside the U. S., add $1.00 for postage.

Satisfaction unconditionally guaranteed—or your money back. Just send your check or money order covering the number of files you want to:

JESSE JONES BOX CORP.

P. O. Box 5120 Philadelphia 41, Pa.

FOR RATES OR INFORMATION

About Classified Advertising

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The McGraw-Hill

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HUbbard 2-7160
H. J. SWEGER

CHICAGO, 11
520 No. Michigan Ave.
MOhawk 4-5800
W. HIGGENS
J. BRENNAN

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Clifton Village, Apt. 2
REdwood 1-3238
G. MILLER

CLEVELAND, 15
1510 Hanna Bldg.
SUperior 1-7000
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DALLAS, 2
Adolphus Tower Bldg.
Main & Akard Sts.
PRospect 5064
D. BILLIAN

DETROIT, 26
856 Penobscot Bldg.
WOodward 2-1793
W. STONE

LOS ANGELES, 17
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MAdison 6-9351
P. CARBERRY

NEW YORK, 36
330 West 42 St.
LOngacre 4-3000
S. HENRY
D. COSTER
R. LAWLESS
R. HATHAWAY

PHILADELPHIA, 3
17th & Sansome St.
RIttenhouse 6-0670
H. BOZARTH
E. MINGLE

ST. LOUIS, 8
3615 Olive St.
JEfferson 5-4867
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PROFESSIONAL SERVICES

J. PAUL BISHOP & ASSOCIATES
Registered Professional Engineers
Established 1945
Specializing in:
Food and Chemical Processes
Consultation—Surveys—Design
Engineering—Estimates—Supervision
of Construction, Installation and Start-Up.
Internationally Known
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FOOD DEVELOPMENT LABORATORY
S. W. ARENSON, *Director*
Ingredient evaluations • New Products development. Specializing in flour shortenings, milk and other basic ingredients • Facilities; chemical and physical laboratory, bakery, spray dryer and other unit process equipment.
2865 W. Franklin St. Baltimore 23, Md.
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LEWIN ASSOCIATES
Consultants
PLANT DESIGN AND LAYOUT — PROCESSING EQUIPMENT — PRODUCT AND PACKAGE DEVELOPMENT AND IMPROVEMENT — WAREHOUSING — DISTRIBUTION — MARKETING RESEARCH — ESTIMATES — REPORTS
243 West 56 Street New York 19, N. Y.
JUdson 6-1748-9

GUSTAVE T. REICH & ASSOCIATES
Consultant to the Food Industries
COMPLETE CONTINUOUS PROCESSES.
Operation — Waste Disposal
AUTOMATION
1422 Chestnut St. Philadelphia 2, Pa.

SCHWARZ LABORATORIES Inc.
Consultation on Food Problems
Analyses of Foods and Beverages
Food Plant Design and Process Improvement
Research and Investigations
Legal Testimony
Write for bulletin describing facilities and services
230 Washington St., Mount Vernon, N. Y.

FOSTER D. SNELL
Research Laboratories
SENSORY PANEL TESTS
Food Analysis, Stability Studies, Evaluations, Packaging Problems, Vitamin Assays.
Write For
"Food Facts"
29 W. 15th St., N. Y. 11 WAtkins 4-8900

STRASBURGER & SIEGEL
Chemists—Bacteriologists—Food Technologists
Specialists in Canned and Glassed Foods
Laboratory Services
Testing Tomato Products, Mayonnaise, Pickles, Oils, Fats, Beverages, Sugars, Filth in Foods
Food and Drug Libels, Expert Testimony
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WALTHAM LABORATORIES, INC.
LABORATORY SERVICES: Food analysis, extraneous matter, bacteriological tests, Water
FOOD PLANT SANITATION — INSPECTION & SAMPLING
817 Moody Street Waltham 54, Mass.

WISCONSIN ALUMNI RESEARCH FOUNDATION
FLAVOR EVALUATION
with Trained or Consumer Panels
Services in biochemistry, nutrition, food technology, microbiology, food inspection and analysis, toxicology, and insecticide testing.
Write for price schedule
P. O. Box 2217-P Madison 1, Wisconsin

WHERE TO

- **STORE** Frozen Foods
- **BUY** Ingredients, Equipment, Parts, Services

CARROT OIL
makes food
golden yellow

Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A.
Carrott oil is preferred for vitaminizing foods because it is a natural vegetable oil and because it contributes vitamin A of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

SEND FOR BOOKLET
New 36-page combined catalog on carrot oil for foods, feeds, and pharmaceuticals. Important reading for most food processors. Write today!

NUTRITIONAL RESEARCH ASSOCIATES
205 Broad St., South Whitley, Ind.

QUAKER CITY COLD STORAGE CO., INC.
PHILADELPHIA, PA.
3 WAREHOUSE LOCATIONS
Proper Temperature for Frozen Foods

the advertisements on the following pages

are live opportunities in the field of food processing and distribution.

Each announcement represents a current Want or Offering of an organization or individual in the field, with some element of profit in each for whoever can fill the need. Some have money-saving possibilities, others are opportunities for more business; many are employment opportunities; still others offer property, or equipment—used or surplus new equipment.

"Searchlight" advertisements are constantly changing. New opportunities are constantly finding their way into this great Want medium, each issue. Regular reading of the "Searchlight" pages can be as important to you as reading the editorial sections; Editorial matter is NEWS OF OPPORTUNITIES offered in the industry.

for EVERY business WANT
"Think SEARCHLIGHT first"

EMPLOYMENT OPPORTUNITIES

The Advertisements in this section include all employment opportunities—executive, management, technical, selling, office, skilled, manual, etc.

Positions Vacant
Positions Wanted
Part Time Work

Civil Service Opportunities
Selling Opportunities Wanted
Selling Opportunities Offered

Employment Agencies
Employment Services
Labor Bureaus

RATES

DISPLAYED

The advertising rate is $18.00 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

An advertising inch is measured ⅞" vertically on a column—3 columns—30 inches to a page.

Subject to Agency Commission.

UNDISPLAYED

$1.50 per line, minimum 3 lines. To figure advance payment count 5 average words as a line.

Positions Wanted—The rate is one-half of the above, payable in advance.

Box Numbers—counts as 1 line.

Discount of 10% if full payment is made in advance for 4 consecutive insertions.

Not subject to Agency Commission.

Send NEW ADS or Inquiries to Classified Advertising Division of FOOD ENGINEERING, P. O. Box 12, N. Y. 36, N. Y. October Issue closes Sept. 27th

OPENING FOR RESEARCH and ANALYTICAL CHEMIST

For large eastern Frozen Food Manufacturer. We are building a new additional research and analytical laboratory, also expanding present quality control laboratory. A competent individual is needed to fill department head position.

Necessary requirements are:

1. B.S. — M.S. — or D.Sc. in Chemistry.
2. Food background and experience in canned foods, juices, or preferably, frozen foods.
3. Must be willing to relocate.
4. Detailed resumes must be presented and will be held in strict confidence.

State necessary salary requirements.

P-2275, Food Engineering
Class. Adv. Div. P.O. Box 12, N.Y. 36, N.Y.

ENGINEER PROCESS DESIGN

General Offices of large multi-plant food processor has Staff Engineering position for experienced Mechanical or Chemical Engineer. Will be responsible for designing production processes for new plants and improvement of existing facilities. This is an old established company with an exceptional record of earnings, growth and stability. Opportunity demands man of highest professional and personal qualifications. The salary will be commensurate with these characteristics and engineering experience. Please submit resume and salary requirements to

P-2775, Food Engineering
Class. Ad. Dpt., P.O. Box 12, N. Y. 30, N. Y.

PACKAGING MAN WANTED

Unusual opportunity for alert young man (25-35) with food packaging knowledge, ability to write, good personality. Position open in New York as packaging specialist on editorial staff of the leading food manufacturing magazine. Can become known as authority on packaging.

P-2803, Food Engineering
Classified Adv. Div., P. O. Box 12,
New York 36, N. Y.

ENGINEER

An unusual opportunity for a project engineer with a nationally known food industry. Position requires knowledge of materials, manufacturing methods and process. Applicant must be willing to prepare layout drawings, job estimates, requisition material, issue shop orders and follow up projects. Central New York City of 14,000. A personal interview will be arranged for qualified applicants. Please state approximate salary requirements and resume to personal attention of Chief Engineer, The Nestle Company, Inc., Fulton, N. Y.

WE NEED

FOOD TECHNOLOGISTS and
FOOD CANNING CANDIDATES
—junior to top-level

Call, write or wire:
Gladys Hunting (Consultant)
Drake Personnel, Inc.
220 S. State St., Chicago 4, Ill.
HArrison 7-8600

REPLIES (Box No.): Address to office nearest you c/o This publication Classified Adv. Div.
NEW YORK: P. O. Box 12 (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

Food Chemist in New York State Department of Agriculture and Markets. $4430-5500. Three openings in Albany. Bachelor's degree with specialization in chemistry and either 2 years experience in the chemical analysis of food products including dairy and related products; or a master's degree in chemistry with specialization in dairy chemistry; or an equivalent combination of experience and training. Applications close on October 5 for November 3, 1956 examination. For details write to Recruitment Office Box 5, New York State Department of Civil Service, Albany, New York.

Wanted: Flavor Chemist with Organic Chemistry background. May be either male or female. Send complete resume of experience and education to P-2699 Food Engineering.

Man with technical background in mechanical or chemical engineering to sell special equipment. Must be free to travel. Headquarters on Long Island, New York. P-2874 Food Engineering.

EMPLOYMENT SERVICE

Salaried Personnel, $5,000-$30,000. This confidential service established 1927 is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. F., P. O. Box 674, Manchester, Vermont.

Manufacturer's Representative, Chemist, well established,

seeks additional representation of reputable Food raw material or supply firm. Chicago and Middlewest.

RA-1336, Food Engineering
520 N. Michigan Ave., Chicago 11, Ill.

MAINTENANCE ENGINEER

Progressive fresh vegetable packaging firm has exceptional opportunity for resourceful, qualified Maintenance Engineer. Eastern location. Salary commensurate with ability and experience. Preference given individual experienced in vegetable prepackaging, freezing, or canning.

FOREMAN

Well-established vegetable packaging firm located in the East. Excellent opportunity for energetic qualified young man to achieve a thorough knowledge of prepackaging in a position offering security and rapid advancement. Preference given individual experienced in vegetable freezing or canning.

Please write stating qualifications and experience.

P-2687, Food Engineering
Class. Adv. Div. P.O. Box 12, N.Y. 36, N.Y.

PRODUCT RESEARCH CHEMIST

General Offices of large national multi plant food processing corporation located in Eastern United States requires an outstanding young Product Research Chemist of the highest professional and personal qualifications. Requires advanced degree on food industry experience in the development of new products and the improvement of existing products.

P-2772, Food Engineering
Class Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

MECHANICAL ENGINEER

B.S. Degree, 28-35. 3 to 5 years experience in refrigeration, piping and plant layout. Report directly to plant engineer with responsibility for plant maintenance and layout of new projects. Salary to $8000. Send qualifications to:

OSCAR MAYER & CO. 1241 N. Sedgwick
Chicago 10 Ralph Johnson, Personnel

YOUR ORGANIZATION

Is it complete?

Are you expanding it?

Making Replacements?

Naturally, you are anxious to secure the most suitable man or men available. You want men with the special training that will make them an asset to your organization. You can contact such men through an advertisement in this Employment Opportunities Section of FOOD ENGINEERING.

Classified Advertising Division

FOOD ENGINEERING
330 W. 42nd St., New York 36, N. Y.

EQUIPMENT MOVING SALE
PELL CHEMICAL CO.
BUFFALO, N. Y.

(Our plant is moving to Colorado)

All equipment can be inspected and shipped immediately. Inspection invited. Individual items or the complete plant priced attractively.

1—Pfaudler glass-lined, steam-jacketed reactor, with agitator, variable speed drive, for 75 p.s.i., about 3 years old.
1—"Pneumatic Scale" 10-head vacuum filler, pints, quarts, half-gallon cans, pint and quart bottles; with Nash vacuum pump.
1—Cellulo Model F-66 filter with transfer pump.
1—Klein diatomaceous #2 filter, 100 sq. ft., stainless, separate closed slurry feeder and meter drive.
1—Ertel Model WE12 filter, bronze construction, with separate pump.
9—7316-gallon each, one-piece welded steel tanks, 10' x 13'6".
1—30-gallon 18/8 Type 304 stainless tank, with cover and stainless valve.
2—100-gallon 18/8 Type 304 stainless tanks.
1—200-gallon 18/8 Type 304 stainless tank.
1—800 gallon stainless clad tank.
1—800-gallon 16 gauge, Type 304 stainless tank.
6—Closed top stainless steel hopper tanks, Type 304, with stainless valve, new, never used.
1—"Lightnin" Model D-4 portable agitator, with 1-½ HP motor.
1—"Alsop" portable agitator with ½ HP motor.
1—New, never used "International" Model B-2 portable agitator with ¼ HP motor.
1—"Lightnin" Model C-4 portable agitator with ¼ HP motor.
1—"Dopp" 50-gallon, Style "D", 2/3 jacketed kettle with double motion agitator.
1—"Dopp" 150-gallon, Style "STD" 2/3 jacketed kettle with bridge-type agitator.
1—R. G. Wright Model "O" stainless, jacketed, insulated pasteurizer, 100-gallon capacity, with agitator, stainless outlet valve.
5—10' sections wheel conveyor.
3—5' sections wheel conveyor.
Misc. stainless pumps, fittings, piping, AC motors and lab equipment—scales, balances, microscopes, etc. For full information, communicate with:

PELL CHEMICAL COMPANY
3078 Main St. Buffalo 14, N. Y.
Telephone: AMherst 3276
Speak with Mr. MICHAEL

For Sale, New Mustard Plant
4—New High Speed Mustard Mills
4—New Mustard Pumps
1—Pneumatic Scale 4 Head Capper
1—Filler Machine 6 Spout Filler, Automatic Feed.
100,000—53 M.M. Caps, Plain.
Brundage Bros. Co., 150 S. Erie St., Toledo, Ohio.

DEVINE SHELF DRYER
18 Hot Shelves, Steam or Water, 85" x 60" with 70 Stainless Steel Trays, Vacuum Pump, Condenser. Excellent Condition.

CALIFORNIA MACHINERY EXCHANGE
420 MARKET ST. SAN FRANCISCO, CALIF.

4 NASH AIR COMPRESSORS FOR SALE
2 Model 572 Nash Hytors, 35 cfm at 35 p.s.i., with 7-½ HP, 60 cycle, 220/440, 3-phase AC motors; also two Model 573 same as above except 40 cfm at 40 p.s.i. and with 10 HP motors. Can be purchased individually reconditioned and guaranteed, 50% off.

FS-2732, Food Engineering
Class Adv. Div. P.O. Box 12, N.Y. 36, N.Y.

BUSINESS OPPORTUNITIES

Business for sale—owner retiring. Mfg. soda fountain supplies. Fine opportunity to own small business. BO-2709 Food Engineering.

Food market & property. Corner location on plot 50x200x500. Thriving town, West Virginia. Near large power plant. 2-4rm apartments above store. Bringing good revenue, hot water heat, business not operating at present due to other interests. Has averaged $50,000 annually. Ideal for aggressive couple. Bargain. Rendlog Sales Co. 1780 Broadway NYC. P1-7-5345. (Brokers Protected)

Food Market (S. S. Pierce Associate Store) Fountain Service, Gas Station, Western Union Agency, and choice property, located thriving resort area, Maine. Fine patronage. Gross receipts $40,000 for season. Substantial profit. Taxes $120. Marvelous opportunity. Act promptly. Rendlog Sales Co. 1780 Broadway NYC P1-7-5345 (Brokers Protected).

SEARCHLIGHT SECTION
(Classified Advertising)

BUSINESS OPPORTUNITIES — EQUIPMENT - USED or RESALE

UNDISPLAYED —RATES— *DISPLAYED*

$1.50 a line, minimum 3 lines. To figure advance payment count 5 average words as a line. BOX NUMBERS count as one line additional in undisplayed ads.

DISCOUNT of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

The advertising rate is $13.25 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request. AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page.
EQUIPMENT WANTED or FOR SALE ADVERTISEMENTS acceptable only in Displayed Style.

Send NEW ADS or Inquiries to Classified Advertising Division of Food Engineering, P. O. Box 12, N. Y. 36, N. Y. October issue closes Sept. 27th.

• • • • IN STOCK AT LOEB'S • • • •

Blender: Patterson conical 6' dia., 5 hp.
Cappers Capem, Titecap, Swanson, U. S. automatic and semi-automatic
Centrifugals: Fletcher 12" copper, 20" lith-coated, Tolhurst 26" copper, 26" rubber
Clarifiers: De Laval model 84-51.
Conveyor, port. Rapid Standard, 16' lg.
Cutter, Bone: Wausau, 5 hp.
Cutters, silent, Buffalo 32" and 43".
Demineralizer: Barnstead 80 GPH.
Disintegrator: Rietz RD-18 st. steel, 75 hp.
Dryer: Devine 2 x 4' vac. drum, st. steel.
Dryers: vacuum shelf, Devine 20 shelf.
Dryer: Bowen lab. spray, st. steel.
Dryer: Direct Heat 4' x 20'.
Dryer: Stokes rotary vacuum 2½ x 8'.
Extractor: Troy 26" monel basket.
Fillers, liquid: Peerless 6 valve, Coss gross weight, siphon and vac. types.
Fillers, piston: Stokes, Colton, Elgin, Filler Machine Co. for jars, tubes.
Fillers, powder: Speedee, Triangle, Stokes & Smith, Ferguson, Gump.
Filter Presses: Sperry, Shriver 6"-36", recessed and plate and frames types.
Filters: Int. pressure—Alsop, Sparkler, Lomax, Industrial, Sweetland.
Filter, vacuum: Oliver 2½ x 1'.
Homogenizer: 2-1200 GHP, Union, 300 GHP, Union, 125 and 400 GPH, Gaulin.
Kettle: Dopp 150 gal., jkt., agitated.
Kettles, Stainless steel 5 to 300 gal., with and without agitators, aluminum 40 to 100 gal.
Labelers: Burt, Knapp, New Jersey, World, Ermold—auto and semi-auto.
Mills, hammer: Mikro, 2DH, 2TH, Gump #1, Prater, Raymond, Jay Bee, Jeffrey 30 x 24", Williams #2 and BX.
Colloid: Charlotte st. steel 1 hp., iron 25 hp.
Mixers: Dough type single and double arm, 5 to 100 gal.
Powder: 50 to 2000 lb. capacity. Portable Electric: ¼ to 5 hp.
Pasteurizer: Wallace-Walker plate type, 200 GPH, st. steel.
Pumps: Centrifugal, rotary, gear, vacuum, all types and sizes.
Screens: Rotex 20 x 48", 42 x 84", 18 x 50", Selectro 4 x 10' Abbe Blutergess #1.
Sealers, carton: Ceco, Triangle, Packamatic.
Sterilizers: Climax 20" x 36" jacketed.
Still, water: Barnstead 75 gal.
Tablet Presses: Single punch and rotary.
Tanks: Glass lined, various sizes. Stain. steel 25 gal. to 1200 gal.

Send us your inquiries and list of idle equipment

LOEB EQUIPMENT SUPPLY CO.
820 West Superior St. Chicago 22, Ill.
Telephone Seeley 8-1431 Our 31st Year

FOR SALE
TUBULAR HEAT EXCHANGER, 24—1"x10' S.S. Tubes.
100 to 400 gal. S.S. Mix Tanks, water jkt.
250 gal. Vert. S.S. Tank, insul. agit.
330 gal. S.S. Tank, 45"-48", side agit.
500 gal. Pfaudler G.L. Tank, Jkt. T.C. Coil
36" & 60" S.S. Vacuum Pans.
125 to 1500 gal. Homogenizers or Viscolizers.
3000 gal. Horiz. Glass Lined Tanks, Agit.
½ & 1/3 H.P. Lightnin Portable Mixers.
#25BB Waukesha Pumps, 1 H.P.
50 gal. S.S. Premixer (Tank), side agit.
26" Vorclone Centrifugals, copper baskets.
Little Giant Ice Breaker, 1 H.P.
Baltimore Aircoil Water Cooling Tower.
4x4 & 5x5 Self Cont. Refrig. Units.
3 H.P. Frigidaire Freon Refrig. Unit.
Milk Pasteurizers, Coolers, Fillers, Washers.

LESTER KEHOE MACHINERY CORP.
One East 42nd Street New York 17, N. Y.

HERE'S THE BEST!
3—Day 15 gal. Pony Mixers, m.d. S.S. cans.
1—Stainless Steel Hersey Rotary Dryer, 5'x26'.
3—Buflovac 42x120, 32x120 Atmos dbl. Drum Dryers, complete; 1—American 24x36.
2—64"x70" and 1—40"x60" Bird Continuous Centrifugals, S/S Solid bowls.
1—Unused #12 Sweetland FILTER, 48 bronze monel covered bottom drainage leaves 3" o/o. latest type: 1—#2, 23 copper leaves 1½" o.o.
1—Day #30 Imperial Jack. Mixer, 75 gal.
9—Sperry 18x18" Filter Presses, 11 ch.
5—Horiz. Dry Powder Ribbon Mixers, 4000#, 1500#, 500#.

OUR 39TH YEAR
Consolidated Products Company, Inc.
158 Observer Hgway, Hoboken, New Jersey
Tel.: HO 3-4435 • N. Y. Tel.: BA 7-0600

SEPTEMBER SPECIALS
Mikro Pulverizers #1-2-3 & 4
MRM 12 spt. SS Straight Line Vac. Filler
2 Pony Labelers 86MXX and 86ML
Biner Ellison Model 16-G Filamatic
Capem SIF Auto. Capper, up to 55 mm.
2 Rotex Sifters 40x84" & 60x120"
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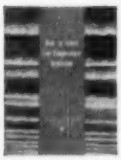

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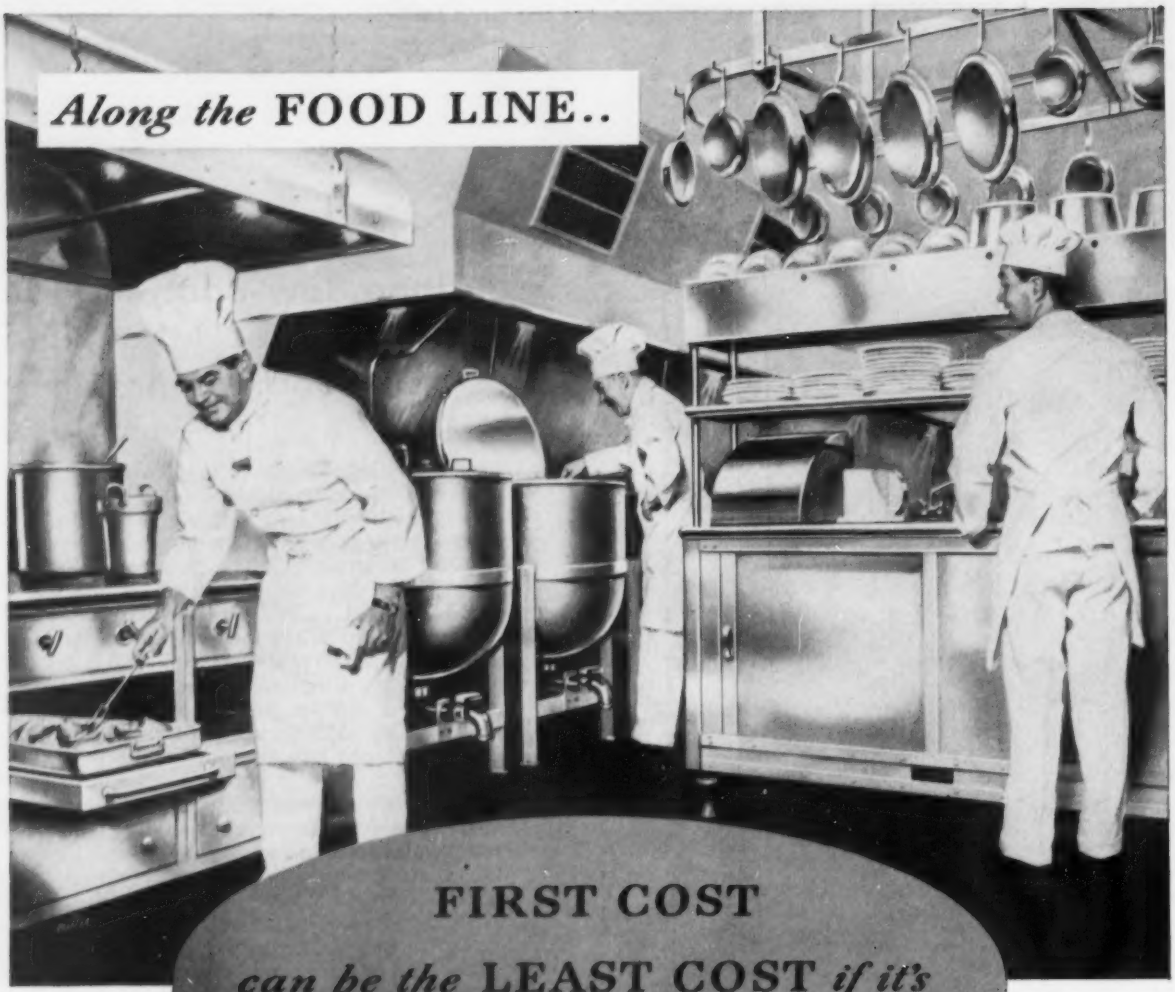

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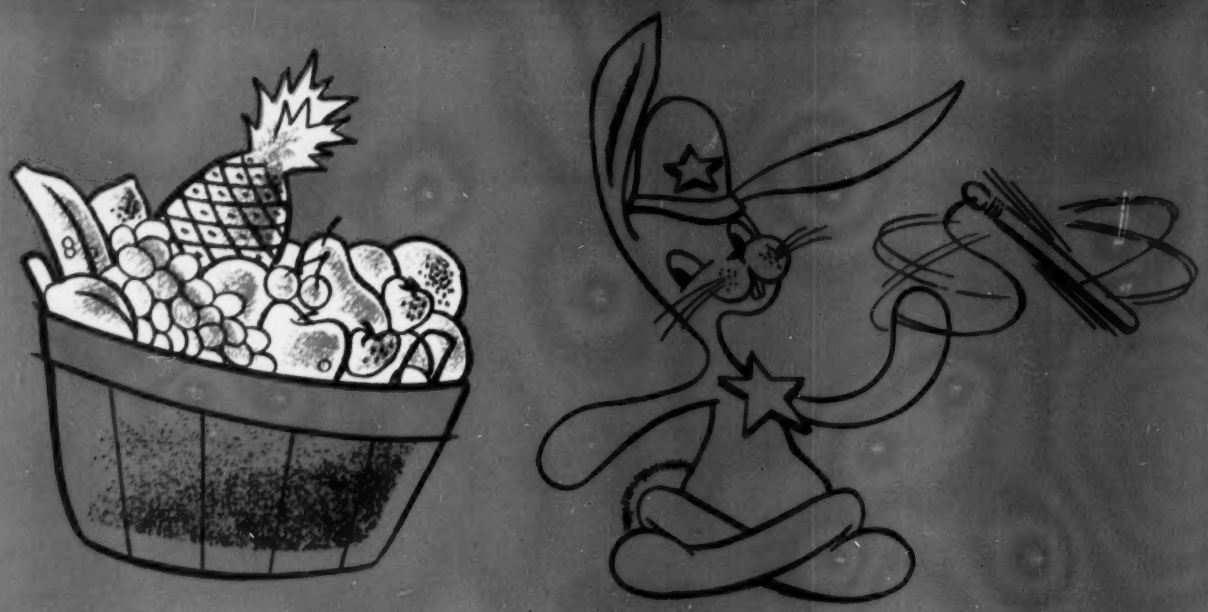

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